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TO CORRESPONDENTS.

Inquirer, Cork.—*Clegg's "Treatise on Coal Gas" is not the work alluded to in our reply to* S. W. H.

W. E. K.—*The balance-sheet is a very creditable one, and leaves no room for unfavourable comment.*

J. P., Berwick.—*We fear we shall not be able to obtain a report. No reporter appears to have been present when the case was argued and the judgment delivered.*

Mr. W. G. Ginty, Manchester.—*We are informed this gentleman feels himself aggrieved by the remarks we felt it our duty to make a few months since, in reply to a communication received from him, considering that we therein impugned his professional character and personal honour and integrity. We have no hesitation in disavowing any such intention, our remarks being chiefly directed against what we conceived to be his indiscreet zeal in defending the interests of his clients.*

Circular to Gas Companies.

The large and, to all present appearances, permanent advance which has been established during the last six months in the prices of coals, freights, wages, iron, and fire goods, must, we apprehend, soon force upon gas companies, new and old, provincial as well as metropolitan, the consideration of a revision of the current prices of the article in which they trade. Gas cannot, in the long run, form an exceptional commodity, but must, like all the other manufactures, rise and fall as the raw materials consumed in its production are cheaper or dearer. The vicious principle introduced of late years by the low-priced gas agitators, of limiting the price by legislative enactment, must soon be put to a severe trial; and, though such companies as have had restrictive conditions of this nature *forced* upon them against their will, may find little difficulty in showing cause why the prices they are allowed to charge should be now increased, yet companies who, like the Great Central, have *voluntarily* come under such engagements, and whose compact with the public and with Parliament is based upon the maintenance of a fixed price, stand in a very different position, and it is difficult to conceive what case they can present to justify any modification of their voluntary contract, unless their contractor shall have terminated his engagements by bankruptcy, and their shareholders shall have been for some years without a moderate dividend. The citizens of London have submitted to the inconvenience of the establishment of a competing gas company, and in return they are entitled to an adequate supply of 12-candle gas at 4s. per 1000 feet. No circumstances short of the catastrophes indicated, can warrant any modification of this compact adverse to the interest of the citizens at large; and it appears to us attention should, therefore, be seriously directed to the devising of some plan which, while it does no injustice to the gas-consuming public, shall place gas companies in a position to enable them to defray the extra expenditure caused by the late advance in the prices of all raw materials and labour, and shall at the same time meet the peculiar position in which the Great Central and other similarly constituted companies stand. There is no disguising the fact that the 4s. clause in the Great Central Act must for ever operate as a bar to any increase in the price of gas in the metropolis and surrounding districts while unreformed; but, if ever that company should find it requisite to go to Parliament with a proposal to supply 16-candle gas at 5s. per 1000 feet, we apprehend they would not only improve their own position, but disarm all opposition by showing that 16-candle gas at 5s. was intrinsically as cheap as 12-candle at 3s. 9d., and that virtually they were benefiting the public by the proposed change. We throw out this hint for the consideration of the parties more immediately concerned, expressing at the same time an opinion that such is a far better course, than tampering with the price without raising the standard of illuminating power.

It is rumoured, and we believe not without some foundation, that the Surrey Consumers' Gas Company are in treaty with the Deptford Gas Company for the purchase of their works, and also with the three other companies who light the Southwark and Surrey districts, for the cession of such a portion of their lighting as will yield a total gas rental of £25,000 per annum to the Consumers' Company, whose expenditure will be thereby carried to about £110,000. Out of this gross rental Mr. Croll, the lessee, pays £7200 as rent, and about £3250 as interest upon the expenditure, in excess of the original capital of £45,000. He consequently reserves about 58 per cent. of the gross rental for working expenses including rates, paying 42 per cent. in rent and interest, out of which the directors have to defray their office expenses and other charges.

The decision of the judges of the Court of Queen's Bench in the case of the Sheffield Consumers' Gas Company has caused considerable anxiety to many gas companies and owners of private gas works whose pipes have been laid without any other authority than that of a highway board. We advise such, to unite in a representation to the Secretary of State for

the Home Department, and to suggest to him the propriety of the Highway Act being so amended as to give the courts of quarter sessions power to inquire into the expediency of granting permission to break up the streets for the supplying of any town with gas, where no statutory power already exists by which such works can be carried into effect. The proceedings may be simple and inexpensive. A presentment may be made, and the grand jury intrusted with the hearing of evidence should any opposition to the application appear, and upon their verdict the permission shall issue or be refused. An analogous power is already vested in the quarter sessions as to the stopping up of footways. Of course due provision must be made for the protection of private property and interests, as well as of companies acting under statutory authority; and the provisions of the Gas Work Clauses Act, 1847, must be imposed upon all applicants who seek this method of legalising their position.

The opposition of the Corporation of Bristol to the Bristol Gas Amalgamation Bill has been carried to the House of Lords, and been there partially successful, inasmuch as a 10-candle quality clause, and a 4s. 6d. maximum price clause, have been forced upon the Amalgamated Company against its consent. That company has however, we apprehend, little cause to be dissatisfied with this apparently adverse decision; but we must record our protest against this mischievous principle of attempting to regulate the price of any manufactured article by act of Parliament, and more especially the fixing of a low price at the expense of a notable reduction in the quality of the article sold. If the Bristol Gas Company act up to the strict letter of their obligations to Parliament, imposed at the instance of the corporate authorities, the gas-consuming public will find their accounts increase some 15 per cent., and be left without any redress.

The indictment laid twelve months since by the authorities of the Corporation of London against the officials of the City Gas Company, for so conducting their works as to cause a public nuisance, has been abandoned, upon the understanding that purification by wet lime, and the discharge of all refuse into the Thames, shall cease. Eighteen months is allowed the company to effect the necessary change in their apparatus.

Our attention has been drawn to a slight inaccuracy in the paragraph inserted in our last number relative to the proceedings at the last meeting of the Equitable Gas Company, which we are anxious to correct. The Imperial Company have not retained any power to repossess themselves of the mains sold to the Equitable Company, the sale being absolute and without reserve.

THE NEW ELECTRIC GAS.

In another part of our columns will be found brief extracts of the recent patent of Mr. E. Clarence Shepherd for making gas.

This patent has excited no little interest amongst scientific men, in consequence of the novelty of its pretended power to generate, by the decomposition of water under the influence of the magneto-electric machine, a gas, or combination of gases, of an inexplosive nature.

That this feat was actually achieved we know upon good authority, and the only question which required elucidation was the cost of the process—a subject dealt with by the inventor in a very loose manner, and got over by a general assertion that the gas in its production cost 3d. per 1000 feet. As the material actually employed was kept a profound secret, it was impossible either to prove or disprove this statement, though we certainly had our suspicions. As, however, speculators in patents, like speculators in "horse-flesh," have always their "settling-day," we quietly awaited the *denouement*, and at last had the satisfaction of unrolling Mr. Shepherd's secret; and what did we find? Why, that the 3d. per 1000 gas results from the oxidation of oxalic acid, and would cost, in reality, not that sum, but as under, upon the supposition that magnets cost nothing; helices of covered copper wire cost nothing; steam-engines cost nothing; fuel cost nothing; labour cost nothing; and the best Scotch naphtha can be had delivered on the works for nothing! Nay, it must even be supposed that a gas containing 50 per cent. of carbonic acid can be purified for nothing.

When oxalic acid and water are subjected to the action of an electric current, the water is decomposed, its oxygen passing to the oxalic acid to form carbonic acid, whilst its hydrogen is set free; of course such a mixture is inexplosive, and, when naphthalised, will burn like common gas. Now, 63 parts by weight of pure oxalic acid will, in this way, generate one of hydrogen; and, as a cubic foot of hydrogen weighs about 40 grains, it would require 63 × 40, or 2520 grains of oxalic acid for its production. But, if one foot requires 2520, then 1000 feet will take 2,520,000 grains, or 360 lb. of oxalic acid; and, as oxalic acid is worth 10d. per lb., our 1000 cubic feet of hydrogen will have cost us, not 3d., but 3600d., or £15 sterling. Need we add another word of comment?

THE SHEFFIELD CONSUMERS' GAS COMPANY.

If ever mortals were in what our Transatlantic brethren call "a tarnation fix," the unlucky shareholders in the Sheffield Consumers' Gas Company are in that unenviable predicament. The bright hopes raised by the refusal of the equity courts to interfere with their proceedings have been succeeded by the most abject despair; and curses, loud as well as deep, may be now heard at the cruel kindness of Lord Chancellor Cranworth in handing them over to the tender mercies of Lord Chief Justice Campbell, instead of stopping them, as he had the power to do, from squandering their funds upon an undertaking which he must have known was illegal. Poor Lord Cranworth is, however, too harshly dealt with: he merely told the applicants for his intervention, that they had mistaken their remedy; that an equity court had no jurisdiction; that the statute law of the land afforded them all necessary protection; and into LAW the parties have plunged with an alacrity almost unparalleled. The coming York assizes are nearly exclusively devoted to the trial of causes arising out of these proceedings. First and foremost, we have some score of actions of ejectment to compel the removal of the Comsumers' Company's pipes, laid through portions of the highways, the soil of which is claimed as the property of the adjacent freeholders, and amongst other plaintiffs is his Grace the Duke of Norfolk, one of the largest owners of property in the town of Sheffield. Next comes Mr. G. H. Palmer, their ex-engineer, who is suing for arrears of salary, under a three years' agreement at £500 per annum, and who was some months since summarily discharged, and now seeks to recover his salary for the interval which has elapsed since his dismissal. Two persons—one of them a poor widow—are driven to the assizes to recover damages for injuries sustained by falling over heaps of stones left in an unguarded state in a dark night upon the highway; and a tradesman claims £45 for the value of a horse irreparably injured through taking fright at a fire lighted on the highway by the company's pipe-layers. These are luxuries in perspective; but a tolerable share of the same delicacies has been already enjoyed, of which it may be useful to future litigants to give an epitome.

On April 17, 1852, a bill was filed in the Court of Chancery by the Sheffield United Gas Company praying for a perpetual injunction to restrain the Consumers' Gas Company from commencing their intended works. The cause was argued on May 22 and 24, before Vice-Chancellor Sir George Turner, and the bill dismissed with costs.

On July 14 of the same year, an information by the Attorney-General, and bill by the United Gas Company, were again filed, and an injunction prayed to restrain the defendants until the further order of the court. On Aug. 3 the injunction was refused, each party paying its own costs. This decision was confirmed Aug. 6, on appeal to the Lords Justices. The information and bill were ultimately dismissed Feb. 16, 1853, without costs, Vice-Chancellor Sir Knight Bruce deeming the plaintiffs entitled to an injunction, and the Lord Chancellor Cranworth, with Vice-Chancellor Sir George Turner, being of a contrary opinion. This terminated the equity proceedings.

On Oct. 16, 1852, three labouring men were fined 40s. each by the magistrates in petty session, for assisting in breaking up the highway and lighting fires for the purpose of laying down the Consumers' Company's mains. This decision was appealed against, and respited at the West Riding sessions of Jan. 7, 1853, but the appeal was finally withdrawn at the late Midsummer sessions. The convictions are consequently confirmed.

On Oct. 22, at the West Riding sessions at Doncaster, the the grand jury returned a true bill of indictment against the Consumers' Gas Company, certain members of the highway board, and others, for breaking up the highway at Neepsend. A verdict of *Guilty* was taken against four of these defendants at the York assizes, March 15, 1853, and the conviction was confirmed by the Court of Queen's Bench on June 4.

The law having been thus laid down by the highest tribunal

in the land, the directors of the Consumers' Gas Company have taken the only course open to them, and at the first sitting of the board after the promulgation of the judgment of the Court of Queen's Bench, they came to the following resolution:—

"Resolved,—That this board, out of respect to the decision of the Court of Queen's Bench, as now for the first time expressed, will discontinue the laying of mains in the streets until legislative sanction shall have been obtained for the purpose, and which sanction this company will apply for in the next session of Parliament.

"Charles Alcock, Chairman."

So rigidly has this resolution been adhered to, that not a service pipe has since been laid, nor an attempt made to repair any of the numerous escapes consequent upon the laying of gas mains under such difficult circumstances, and in the face of the active opposition existing at the time. The defendants will be called up for judgment in November next, and in the mean time are cautiously avoiding the committal of any act which can be construed into an aggravation of the offence.

Whether the concern can be kept afloat till Parliament shall have decided upon its fate, is very questionable. That the promoters are at loggerheads with each other is notorious, from the unceremonious manner in which their late engineer was dismissed, and from facts which now and then leak out through the medium of a police report. It is only a few weeks since, Mr. Wm. Frederick Ibbotson, merchant, and one of the directors of the Gas Consumers' Company, appeared at the Sheffield Townhall, and swore to an information before the magistrates, charging Mr. George Flintoff, the company's secretary, with having, on June 13, violently threatened him, and said that "he had been laying in wait for him and had been disappointed; but, when he did meet with him, he would give him the most tremendous thrashing he had ever had"; and that from the threat so used, he, the said W. F. Ibbotson, was afraid the said G. Flintoff would do him some bodily harm, and therefore prayed that he might be required to find sufficient sureties to keep the peace.

Pretty conduct this on the part of a servant to one of his masters; but those who recollect the circumstances attending the same individual's appearance at the police court of the Mansion-house in the City of London, some few years since, will feel no surprise.

One hundred shares, the property of an ex-director, upon which £400 had been paid, were sold by auction on the 4th inst. for £175, rather a long price, considering that, if the sanction of Parliament is not obtained, the liabilities of the concern may become the debts of each individual shareholder, while the property buried under ground can neither be used nor removed nor converted into money. Some of the shareholders have had an inkling of what was in store for them, and amongt others an original director, Mr. W. Rooke Harrison, architect, against whom a bill has been filed in Chancery, to compel him to sign the company's deed of settlement, and to pay the calls on 100 shares allotted to him. The case was set down for hearing in the Rolls Court during Trinity Term, but was postponed on the application of the defendant, to enable him to file affidavits in answer to those put in on behalf of the company. These affidavits have since been filed. The affidavits on behalf of the company, which are lengthy, set forth that Mr. Harrison was one of the original promoters of the company; that he acted with the provisional committee on several occasions; that he applied in writing for 100 shares, which were allotted to him, and that he paid the deposit thereon of 6d. per share, but when called upon to sign the deed of settlement, refused to do so, and had not since paid any of the calls. Mr. Harrison's affidavits set forth that he refuses to sign the deed because it is not in accordance with the original prospectus of the company, and the understanding there was amongst its promoters; that it was originally held out to the public and the subscribers, as one of the chief grounds on which the company should be supported, that the company could carry on their works, could lay their mains through the streets, and supply gas, without an act of Parliament; whereas, on looking over the deed of settlement when handed to him for signature, Mr. Harrison found that it gave the company power to go to Parliament at the expense of the shareholders, and obtain such acts as they thought proper. One of the chief reasons for which the new company was started was, that the old company had turned gas-fitters and manufacturers of fittings; but, on looking at the deed of settlement, Mr. Harrison found that the new company themselves took power to manufacture gas-fittings, to deal in building materials, &c. On discovering these and other objectionable matters in the deed, Mr. Harrison refused to execute it, and contended that he was not by law liable to do so.

The cause was heard by the Master of the Rolls on the 4th instant, who, without calling upon the defendant's counsel for a reply, *dismissed the bill with costs*. Lucky Mr. Harrison to have escaped so easily from so perilous a position; how many will envy you before a year has passed over their heads!

Another class through whose aid the unlucky dupes have been brought into their present hopeless state ought to take warning, from the risk they run of being severely punished for their rashness. We allude to the contractors, who have bound themselves to look only to the property of the company for payment of their claims, and renounced all recourse against the individual shareholders who may have paid up their subscribed capital in full. Suppose an act of Parliament is applied for and refused, the land and the bricks and mortar placed thereon, constitute the entire of the security of this class, and "first come first served" applies to insolvent corporations as well as to individuals. Some favoured creditor, or one more urgent than the rest, may get judgment, step in and clear all off. The pipes are buried in the ground, and there they must remain, unless the owners of the soil choose to set the sheriff at work to eject them, or the old gas company can be induced to purchase them as old metal. The lawyers, however, are understood not to have joined the contractors in the undertaking to look only to the assets of the company for payment of their costs. No, no: they are not so simple; they are too "wide awake." Mr. Vickers and Mr. Branson prefer a few substantial shareholders as their debtors, to a bankrupt incorporated company, the bulk of whose property is not "come-atable"; and, as a parliamentary contest is in store, the lawyer's bill will probably be something handsome in the end.

In fact, such an *imbroglio* never came under our notice; and a leaky gasholder tank, requiring the services of a steam-engine night and day to keep it full of water in order to maintain the supply of gas to 100 or 150 customers, does not diminish the difficulties of the position.

And all this arises because the promoters, disregarding the advice of their own legal advisers, preferred appealing to popular clamour and mob law, rather than submit their case to Parliament, as all the companies similarly circumstanced have hitherto done. We know not whether the complaints of the gas-consumers of Sheffield are well or ill founded, and we have never pronounced any opinion thereon. All we have contended for is—and the result has proved we were right in our first view of the case—that committees of Parliament, and not highway boards, were the proper tribunals to determine whether competition in gas was in this particular instance called for by the misdeeds of the company which, under statutory authority, now enjoys a monopoly of the supply. We are committed to neither party upon this point; and our only desire now is to see the important local question of the supply of gas adjusted in a manner that shall confer the *maximum* amount of benefit on the town at large, without undue regard to private interests, and irrespective of factious considerations.

THE CENTRAL BOARD OF HEALTH.

If there be at the present time one subject in this world which requires, on the part of the British public, a more calm and dispassionate investigation than another, the circumstances connected with the origin and progress of the so-called "Board of Health" must be admitted as beyond all things qualified to hold the palm of priority. We are all sensibly alive to the great fact that a Board of Health exists; but how it came, why it came, what it does, or what it was meant to do, are precisely the points upon which Great Britain has yet to be informed; and as it is abundantly clear that the said "Board of Health" either can give no explanation, or will give none, which comes to the same thing, the people of England must search for information as they best can, with a view to solve some of the queries included in the above category. In geology it is not unusual to discover the value of a particular deposit by ascertaining the nature of the formation from which it was produced; and similarly it happens now and then that the worth of a political clique of individuals may be very correctly guessed at by referring back to their antecedent connections.

Now, the great originator of the Board of Health was Mr. Edwin Chadwick; and Mr. Edwin Chadwick was Lord John Russell's "man Friday," or charwoman—no easy or sinecure situation, by-the-by, for your true Reformado-Whig has always a great deal of dirty work on hand, and "like master like

man" is a good old adage. At all events, your Whig is a first-rate fabricator of new situations, and can juggle away an old office as easily as a thimble-rig man can abstract "a pea"; and, like the same dexterous operator, too, he always contrives to make it reappear where it was least desired or expected. In the guise of economy, "Whiggery" has abolished almost half the official situations in the kingdom, and pensioned off their antiquated Tory occupants; but, strange to say, these situations have risen again, like the ghost of Banquo, "with forty mortal murders on their crowns," and now "push us from our stools." Every single office destroyed by the Whigs has been replaced under another name, and most systematically filled with Whiglings of the Chadwick type—active, useful, enterprising, not very particular men, such as "Coppock to wit," who make a business of the thing, and are never so much astonished as when they find that they were supposed to be serious in their professions.

Now, since the public do, some how or other, associate the names of certain men with certain things, and judge of the thing done by the quality of the agent, we have great reason to enter into a minute inquiry of the causes which led to the formation of our present Board of Health, even if this Board had shown itself more practically useful than now appears. In short, if Mr. Hudson and M. Soyer are renowned for their culinary prowess, if Mr. Coppock is matchless as a parliamentary sedan-chair, if my Lord John has no affection for candidates named Russell, and if Mr. Chadwick can write "Blue Books" with equal ease, accuracy, and candour upon any and every subject within the grasp of human and superhuman knowledge, why should the public not associate, as usual, the value of the thing with the worth of that which produced it? "*Ex nihilo nihilum fit!*" has, very likely, its antithesis; and as extremes, we are told, meet, it is possible that a man who can do everything may be good at nothing, and hence the fatal failure of the Board of Health at Croydon.

But, to return to the main question of our list, "how first came this Board of Health? Did the people of England ask for it? Did they perceive the necessity for such a thing? Did they understand the evil which it was proposed to remedy? Did they, in short, want a Board of Health? We answer, fearlessly, they wanted nothing of the kind; they were content to regulate their own affairs as their forefathers had done, and to advance in the road of improvement by the aid of those cautious and sagacious principles which have placed Great Britain in the first rank of civilised nations. They had no fanciful theories to work out, no preconceived results to verify, no salary to hunt for; they were not blind to the possibility of improvement, nor were they ignorant of the existence of unscrupulous schemes; and they looked with some jealousy upon an office which their intuitive knowledge convinced them was, to say the least of it, unconstitutional, which they felt had been got up as a gross job for the benefit of its concocters, and which interfered with the established rights and privileges of the ratepayers of the empire. Nor have their misgivings been unfruitful in facts; and, though it is now apparent that the days of this health job are numbered, yet the greatest vigilance is still required to prevent the resuscitation of the monster in some other equally obnoxious form.

Away with all Government interference in matters of public health and public welfare; away with centralisation; let power be diffused in the hands of those from whom alone power springs—to whom alone power belongs. What! shall it be said that, in the nineteenth century, England knew not how to preserve itself from the evils of pestilential filth?—that it was then necessary for Mr. Edwin Chadwick, of illimitable knowledge, to look after us like a parcel of nursery children? Pshaw! the mere idea is an affront; for who, in the name of Esculapius, is this Mr. Edwin Chadwick, and what are his sanitary qualifications? Must all the medical talent and skill of this great kingdom be regarded but as dust in the balance when compared with the *dilettanti* performances of this self-qualified personage; are our best chemists and engineers, our most acute business-men, all to bow the head when Mr. Chadwick speaks? Or shall we, as heretofore, continue the good old Saxon customs of our ancestors—see with our own eyes, hear with our ears, judge by our own intellects, and make that use of the talents accorded to us by a beneficent Providence for our own guidance that common sense demands, and to renounce the use of which would not only be a folly and a crime, but a sin and an insult to our Creator? The proper and constitutional Board of Health in Great Britain must be formed from the ratepayers of the country; they alone have a right to spend the money by whom the money is contributed. It is the law of the land. Let this subject, then, we again repeat, be investigated with caution and calmness. The powers assumed and exercised by the present Board of Health are unknown and repugnant to the spirit of our constitution, which has never permitted money to be raised and squandered away upon any pretext whatever without the consent and approval of the people. Even majesty itself may not depart from this acknowledged principle; the mere attempt to infringe which cost one British monarch both his crown and his head. There is no such power as that which can supersede the control of the ratepayers of this country over the funds they themselves create; they alone have, and ought to have, authority over such funds. The public, then, is much indebted to Mr. Hawksley for manfully exposing the evil consequences of the new system, as it brings out more clearly the real advantages of the old one; and, though Croydon has suffered, it is well, it is providential, that it has so suffered; for thus we learn that an insidious attack has been made, not only upon the health of the people, but upon something of even greater importance—the health and welfare of the free and independent constitution of the British Empire.

PRESENTATION OF A TESTIMONIAL TO JOHN KIRKHAM, ESQ.

It is a pleasing and honourable characteristic of English workmen that they are ever among the first to acknowledge and return with sincerity the kindness of their benefactors, employers, and masters. From Mr. Cobden to Sir R. Peel, and from these down to hundreds of kind-hearted individuals, who have felt that their interests were as one with the interests of the workmen they employed, we could give innumerable instances of a grateful recognition by English workmen of their due and just appreciation of those little kindnesses on the part of their masters which will never, we hope, disappear from the arena of British industry. It is, therefore, with great pleasure that we record an example of this kind—so genuine, so true to the great principles of human sympathy, and withal so unlooked for by the person selected for its reception, as to prove beyond doubt that the humble penny of the working man can confer a degree of dignity and honour beyond the reach of many a diadem.

On the 27th ult., a deputation of the working men employed by the Imperial Gas Company waited upon their late engineer-in-chief, John Kirkham, Esq., and presented him with a beautiful silver claret jug and salver, the workmanship of those admired *artistes*, Messrs. Hunt and Roskell. The whole was adorned with an appropriate inscription, importing that this claret jug and salver had been presented to John Kirkham, Esq., of No. 3, Tonbridge-place, New-road, by the working men of the Imperial Gas Light and Coke Company, as an acknowledgment of his uniform kindness to them during the long period of twenty-three years, in which he had been to them a most worthy master. An address in the same spirit was delivered by one of the presenters at the moment of presentation. New facts of this kind are very cheering indications of a better state of things, and teach us to appreciate the value of cherishing the good feelings of those whom fortune has placed beneath us in the worldly struggle of life. Nor can any one doubt that such feelings tend more than is generally supposed towards the prosperity of that concern in which they are most felt and cultivated. The present is a remarkable case in point, to prove the truth of our assertion.

It is twenty-three years since Mr. Kirkham joined the Imperial Company—that company now so wonderfully prosperous. But what was it when Mr. Kirkham joined it? We can say with more propriety, perhaps, what it was not. Why, then it was not a paying concern at all—it was not even solvent—it had no credit—no name, but such as it would have been advantageous to lose—in short, it was *not quite* bankrupt. In this condition of things, Mr. Kirkham seized the helm of the sinking vessel; he put her head to the wind and braved the tempest; an ocean of debts swept over her, but she still swam, she righted; the directors took confidence, the surprised public ceased to doubt, and, catching the gale, the skilful pilot not only weathered the storm, but majestically ran his trim vessel into a harbour both of safety and profit. This did John Kirkham for the sinking Imperial Company—and, "alone he did it."

TABLE

OF THE DISCHARGE OF GAS, IN CUBIC FEET PER HOUR, THROUGH PIPES OF VARIOUS DIAMETERS AND LENGTHS, AT DIFFERENT PRESSURES.

By Thomas G. Barlow, C.E.

(*The Specific Gravity of the Gas is estimated at* ·4, *Air being* 1.)

[Concluded from p. 54.]

Diameter of Pipe, 22 in.

Length in yards	500.	750.	1000.	1500.	2000.	2500.	3000.
Quantity delivered with 0·1 in. pressure	68600·	56000·	48400·	39600·	34300·	30700·	28000·
„ 0·2 „	96800·	79200·	68600·	56000·	48400·	43400·	39600·
„ 0·3 „	118800·	96800·	84000·	68600·	59400·	53300·	48400·
„ 0·4 „	137200·	112000·	96800·	79200·	68600·	61400·	56000·
„ 0·5 „	153500·	122500·	108200·	88600·	76800·	68400·	61200·
„ 0·6 „	..	137200·	118800·	96800·	84000·	75000·	68600·
„ 0·8 „	..	..	137200·	112000·	96800·	86500·	79200·
„ 1· „	..	..	..	122500·	108200·	96800·	88600·
„ 1·5 „	..	..	..	..	132000·	118800·	108200·
„ 2· „	..	..	..	..	..	137200·	122500·
„ 2·5 „	..	..	..	..	..	..	140000·

Diameter of Pipe, 24 in.

Length in yards	500.	750.	1000.	1500.	2000.	2500.	3000.
Quantity delivered with 0·1 in. pressure	84000·	68600·	59500·	48500·	42000·	37500·	34300·
„ 0·2 „	119000·	97000·	84000·	68600·	59500·	53400·	48500·
„ 0·3 „	145500·	119000·	103000·	84000·	72700·	65200·	59500·
„ 0·4 „	168000·	137200·	119000·	97000·	84000·	75000·	68600·
„ 0·5 „	187500·	155000·	135600·	108600·	93800·	84000·	77500·
„ 0·6 „	..	168000·	145000·	119000·	103000·	92000·	84000·
„ 0·8 „	..	..	..	168 000·	137200·	119000·	106000·	97000·
„ 1· „	..	..	..	..	155000·	135600·	119000·	108600·
„ 1·5 „	..	..	..	..	..	163000·	145500·	135600·
„ 2· „	..	..	..	..	..	..	168000·	155000·
„ 2·5 „	..	..	..	..	..	..	..	172000·

Diameter of Pipe, 26 in.

Length in yards	750.	1000.	1500.	2000.	2500.	3000.	4000·
Quantity delivered with 0·1 in. pressure	85000·	73500·	60000·	52000·	46500·	42500·	36750·
„ 0·2 „	120000·	104000·	85000·	73500·	65800·	60000·	52000·
„ 0·3 „	147000·	127000·	104000·	90000·	80600·	73500·	63500·
„ 0·4 „	170000·	147000·	120000·	104000·	93000·	85000·	73500·
„ 0·5 „	189000·	165000·	134000·	116000·	104000·	94500·	82500·
„ 0·6 „	208000·	180000·	147000·	127000·	114000·	104000·	90000·
„ 0·8 „	..	208000·	170000·	147000·	132000·	120000·	104000·
„ 1· „	..	..	189000·	165000·	147000·	134000·	116000·
„ 1·5 „	..	..	..	201000·	180000·	165000·	142000·
„ 2· „	..	..	..	..	208000·	189000·	165000·
„ 2·5 „	..	..	..	..	..	213000·	184000·
„ 3· „	..	..	..	..	..	..	201000·

Diameter of Pipe, 28 in.

Length in yards	1000.	1500.	2000.	2500.	3000.	4000.	5000.
Quantity delivered with 0·5 in. pressure	198000·	161000·	140000·	125000·	114500·	99000·	88600·
„ 1· „	280000·	229000·	198000·	177000·	161000·	140000·	125000·
„ 1·5 „	..	280000·	241000·	216000·	198000·	171000·	153500·
„ 2· „	..	..	280000·	250000·	229000·	198000·	177200·
„ 2·5 „	..	..	..	280000·	255000·	222000·	198000·
„ 3· „	..	..	..	..	280000·	241000·	216000·

Diameter of Pipe, 30 in.

Length in yards	1000.	2000.	3000.	4000.	5000.	7500.	10,000.
Quantity delivered with 0·5 in. pressure	234000·	166000·	135000·	117000·	105000·	86000·	74500·
„ 1· „	332000·	234000·	192000·	166000·	149000·	121500·	105000·
„ 1·5 „	..	287000·	234000·	203000·	182000·	149000·	128500·
„ 2· „	..	..	270000·	234000·	210000·	172000·	149000·
„ 2·5 „	..	..	..	263000·	234000·	192000·	166000·
„ 3· „	..	..	..	..	257000·	210000·	182000·
„ 4· „	..	..	..	..	..	243000·	210000·

Diameter of Pipe, 36 in.

Length in yards	1000.	2000.	3000.	4000.	5000.	7500.	10,000.
Quantity delivered with 1· in. pressure	530000·	372000·	303000·	265000·	234000·	192000·	166000·
„ 1·5 „	..	456000·	372000·	322000·	288000·	234000·	204000·
„ 2· „	..	..	428000·	372000·	332000·	271000·	234000·
„ 2·5 „	..	..	..	416000·	372000·	303000·	265000·
„ 3· „	..	..	..	..	407000·	332000·	288000·
„ 4· „	..	..	..	..	..	384000·	332000·

Table of Square Roots of the Specific Gravity of Gas, from ·350 to ·700.—(*See observations at p.* 176.)

·350 .. ·5916	·395 .. ·6285	·440 .. ·6633	·485 .. ·6964	·530 .. ·7280	·575 .. ·7583	·620 .. ·7874	·665 .. ·8155
·355 .. ·5958	·400 .. ·6325	·445 .. ·6671	·490 .. ·7000	·535 .. ·7314	·580 .. ·7616	·625 .. ·7905	·670 .. ·8185
·360 .. ·6000	·405 .. ·6364	·450 .. ·6708	·495 .. ·7035	·540 .. ·7348	·585 .. ·7648	·630 .. ·7937	·675 .. ·8216
·365 .. ·6041	·410 .. ·6403	·455 .. ·6745	·500 .. ·7071	·545 .. ·7382	·590 .. ·7681	·635 .. ·7969	·680 .. ·8246
·370 .. ·6083	·415 .. ·6442	·460 .. ·6782	·505 .. ·7106	·550 .. ·7416	·595 .. ·7713	·640 .. ·8000	·685 .. ·8276
·375 .. ·6124	·420 .. ·6481	·465 .. ·6819	·510 .. ·7141	·555 .. ·7449	·600 .. ·7746	·645 .. ·8031	·690 .. ·8306
·380 .. ·6164	·425 .. ·6519	·470 .. ·6856	·515 .. ·7176	·560 .. ·7483	·605 .. ·7778	·650 .. ·8062	·695 .. ·8337
·385 .. ·6205	·430 .. ·6557	·475 .. ·6892	·520 .. ·7212	·565 .. ·7517	·610 .. ·7810	·655 .. ·8093	·700 .. ·8367
·390 .. ·6245	·435 .. ·6595	·480 .. ·6928	·525 .. ·7246	·570 .. ·7549	·615 .. ·7842	·660 .. ·8124	

Communicated Articles.

APPLICATION OF TABLES OF THE DISCHARGE OF GAS THROUGH PIPES.

The annexed tables are calculated upon the basis of the specific gravity of the gas being ·400. The quantities of gas discharged of any other specific gravity may be ascertained by multiplying the quantities indicated in the table by ·6325 (the square root of ·400), and dividing the product by the square root of the specific gravity of the other gas. To facilitate these calculations a table is annexed of the square roots of specific gravities from ·350 to ·700, rising ·005 at each step.

Example.—If a 12-inch pipe 1000 yards long discharges 23,800 feet per hour of gas, specific gravity ·400, with a loss of 0·5 in. pressure, how much will the same pipe discharge of gas, when the specific gravity is ·560, with the same loss of pressure?

$$\frac{23{,}800 \times \cdot6325}{\cdot7483} = 20{,}116 \text{ Answer.}$$

The tables are also susceptible of being extended to longer and shorter lengths, and to higher pressures, by the application of the following axioms:—

1. The discharge of gas will be doubled when the length of the pipe is only one-fourth of any of the lengths given in the table.
2. The discharge of gas will be only one-half when the length of the pipe is four times greater than the lengths given in the table.
3. The discharge of gas is doubled by the application of four times the pressure.

THE CHEMISTRY OF GAS LIGHTING.

(*Continued from page* 105.)

It may, perhaps, excite a little surprise when, upon examining into the nature and production of coal tar, we come to treat of it first as a purifying agent. Nevertheless, such it really is; and without this or some similarly constituted substance, there can be no doubt in the world that the purification of coal gas would be almost an utter impossibility. If coal tar be dissolved in sulphuric ether, and left for severl weeks in a state of perfect repose, it will be found that a very large amount of extremely divided carbon or charcoal has settled to the bottom of the vessel, and the precipitation of this carbon, in union with a portion of oily matter, may be at once effected by adding a little strong sulphuric acid to common coal tar. Hence, we find that tar consists not only of several compounds of a fluid kind as usually represented, but contains also a large proportion of solid carbon or soot, which soot or carbon has been removed from mechanical admixture with the gas by the peculiar attractive and condensing power of the various hydro-carbon compounds. As it is well known that soot has a great affinity for hydro-carbon vapours, it is unnecessary to say that these must also have a like affinity for soot; and therefore the minute and almost atomically divided particles of carbon which arise during the destructive distillation of coal, being in immediate contact with hydro-carbon vapour, combine with and are condensed with this vapour into the black viscid fluid called tar. Nor would it, as we have said, be possible to separate this carbon from the gas, unless some such arrangement existed as that by which the tarry vapours and the carbonaceous particles are first brought into mechanical admixture, and subsequently condensed together into one fluid. If, therefore, it were possible to make gas without the production of condensible hydro-carbon compounds, the subsequent difficulty caused by the accumulation of carbonaceous particles, would oppose an insurmountable barrier to success. And, indeed, this is actually one of the impediments felt, and most seriously felt, in all the various projects for converting coal tar into gas, whether this is sought to be done upon the tar in its incipient and nascent state, or upon the commercial article after its production and condensation. In both cases, the most obstinate deposits of soot are observed to take place in the upright pipes, the hydraulic mains, the condensers, or even in the purifiers, and sometimes in all of these. This soot has no affinity for water or watery vapour, which indeed repels it, consequently steam is of no use in effecting its condensation; and it is so minutely divided, and so little ponderous, that the mere current of the gas is sufficient, by its motion, to carry it occasionally even into the street mains. Naphtha, turpentine, and electro-negative vapours generally, are the only agents capable of combining with it; electro-positive vapours, as that of water, repel it. And this brings us back to our previous assertion, that coal tar, or, rather, the hydro-carbon compounds contained in coal tar, exercise an important and indispensable function towards the purification of gas. Those gas engineers, therefore, who seek the destruction of these hydro-carbons, are really aiming a blow at a good friend; and few who have tried to make gas from coal tar alone, or from coal tar and steam, will hesitate to admit that the difficulty which ultimately subdued all their enthusiasm was precisely the want of a practical means of condensing or removing from the gas the finely divided soot or carbon given off in the process; and which, by the common method, is so simply and effectually done, that its very existence has hitherto escaped general observation.

Let us, therefore, become better acquainted with our friends, and not look upon common coal tar as an altogether useless residuum; those who use high heats are more indebted than they are aware of to this object of their horror and detestation. We venture to predict that the man who first achieves the total destruction of coal tar during the distillation of coal, will most likely live to regret his ingenuity.

Coal tar, therefore, consists of certain, or perhaps uncertain, hydro-carbon compounds, mixed with, more or less, soot in a finely divided form. Of course, this soot varies in quantity with the nature of the distillatory process: where low heats are employed, the soot or carbon is trifling in quantity, and the tar fluid; but where the heats are high, the proportion of solid carbon is much greater, and the tar, even if warmed, retains a distinctly viscid character. The nature of the coal, however, has very much to do with the quality of the tar; cannel coal tar being always richer in hydro-carbons than that from common coal, and it is also more fluid and of a less specific gravity.

Omitting any further notice of the carbon mechanically contained in it, coal tar may in a practical sense be divided into two fluids: first, a rather volatile fluid, or naphtha; and secondly, a more fixed and oily compound, generally called "dead oil." Of course, we are not ignorant of the fact that both of these really consist of several different hydro-carbons, to which, or at least to many of which names have been given in accordance with the existing views of chemical nomenclature, or with the fancy of the fancied original discoverer. Thus, we have oles and ines and iles and ides and other terminations in abundance, with formulæ representing their atomic constitution, and the constitution of their derivatives to the fifth and sixth generations. All of which are very pretty in a chemico-artistic sense, but not exactly fit for our present purpose. As, however, some of our readers may wish to have a specimen of this description of "fine art," we give the following list of substances to be found in coal tar, with the derivatives of one only of the compounds, from which the nature of the others may be guessed at.

Substances said to be found in coal tar:—Benzole, phenyle, toluidine, leucoline or quinoline, picoline, pyrrole, animine, olanine, naphthaline, paranaphthaline, eupion, pittical, picamar, creasote, paraffine, copnomor, and aniline, or, as this last has also been called, cyanole, crystalline, or benzidam. For an example of derivatives we take aniline, which may, it appears, be *transmogrified* into the following list:—

Analine, chloranaline, dichloranaline, trichloranaline, bromanaline, dibromanaline, tribromanaline, chlorodibromanaline, nitranaline, and nitrodibromanaline, and very likely also into as many more compounds of fluorine, cyanogen, &c. It may also, it appears, be converted into indigo, if we knew how, just as naphthaline can be made into madder roots when we have found out the proper process. All this is, beyond doubt, very interesting, and serves well to mark the character of the age we live in. It is, however, to be regretted that nothing satisfactory, in a commercial sense, has yet arisen out of these otherwise valuable discoveries. We are consequently, therefore, left very much in the same state in which the analine series found us; and hence we shall enter, without further ceremony, upon a description of the practical mode of treating those two old-established articles of industrial enterprise—coal-tar naphtha, and dead oil.

When coal tar, and more especially that description known as cannel-coal tar, is subjected to the action of heat in a distillatory apparatus, it is rapidly resolved into water, naphtha, carbon, or charcoal, and various heavy hydro-carbonaceous compounds or mineral oils. Of these, the carbon or charcoal alone remains in the retort, whilst the water, naphtha, and mineral oils, pass away, and may be collected in a condenser. As we have before alluded to the origin of the charcoal in coal tar, we need only here point out the fact of its invariable presence in the still or retort after the distillation of tar, in order that it may be regarded in its true light—not as a substance derived from the decomposition of any part of the tar, but simply as a non-volatile residuum previously existing in it. In respect to the volatile constituents, there is no doubt some decomposition and rearrangement of atoms through the action of the heat; but this is vastly less in amount than has hitherto been supposed, for almost exactly the same substances, and in almost exactly the same proportions, may be procured from coal tar by the use of chemical reagents, though no heat whatever be employed during their application.

Returning, however, to the volatile constituents which can be derived from coal tar by the action of what is termed a dry heat, we find that these may be divided into two very distinct classes, the one of which is not only more volatile than the other, but possesses a property peculiar to volatile oils, viz., that of being soluble in steam, or, to speak practically, the power of distilling or volatilising at a temperature of 212°, when water or steam is present. Now, the more fixed mineral oils have not this property; and hence it is much better in the treatment of tar to remove first the naphtha, or highly volatile part, by means of steam, and afterwards to employ a dry heat for the purpose of obtaining the heavy mineral oils. For the separation of the naphtha from coal tar, no apparatus has ever yet been invented which can be compared to the peculiar form of still known by the name of "Coffey's still," in honour of its inventor, the late Mr. Philip Coffey. By the aid

of this philosophical contrivance, the naphtha produced at the first operation is so pure as greatly to diminish the cost of its subsequent treatment. Hence we are induced to give a brief description of this form of still, when modified so as to suit the purpose of the distiller of coal tar:—

Having provided a rectangular vessel of tin or sheet iron, the sides of which are respectively 15 inches and 30 inches in length, and the height from 4 to 5 feet, this is to be fitted with a number of trays, having each raised edges of the depth of an inch, and pierced at one end by a short tube which rises half an inch from the bottom of each tray. These trays fit the rectangular vessel very closely, and are each fastened to it so as to be air-tight, the whole being piled upon each other, and kept separate only by the raised sides, with this precaution, that each tray is so arranged that its short tube or overflow-pipe is at an opposite side or end of the apparatus to that of the tray immediately above and below it. Thus, supposing a stream of water poured into the highest or upper tray, this, in passing to the lowest, would flow continually from right to left in its passage through the overflow-pipes of the apparatus, until all the trays were filled to the depth of half an inch. And, if we now imagine a current of steam sent in the opposite direction, that is, from below upwards, this would necessarily act first upon the bottom of the lowest tray, then, passing up through the overflow-tube, it would heat the surface of the fluid contained in that tray, and, at the same time, act upon the bottom of the second tray, and so on up to the highest, so that the amount of heating surface exposed to the action of the steam would be equal to exactly double the surface of the whole of the trays. Now, in such an instrument as we have been describing, the number of trays would be about 40, consequently, as each tray has an area of 450 square inches, the total surface acted on by the steam must be 36,000 square inches, or upwards of 240 square feet: a prodigious amount for so small a vessel, and which fully accounts for the surprising nature of the effects it produces. To complete this apparatus, it is closed both at top and bottom, except at two places in each instance—that is to say, an opening is made in the top for the end of a syphon-funnel, by which the tar is admitted, and another near it for the exit of the naphtha and steam, which pass to an ordinary refrigerator; in the bottom, a syphon-pipe is placed for the discharge of the residuary tar and condensed water, and a little above it a pipe terminates, intended for the introduction of steam previously generated in a separate boiler. Thus, whilst the tar is continually let in at the top, and the steam at the bottom, the naphtha rises with the steam and passes to the condenser, whilst the less volatile portions of the tar flow out of the syphon-pipe with the condensed steam or water at the bottom. These last are conducted into a large vessel, and allowed to separate by the force of gravity. In this way the crude tar is resolved into naphtha and fluid pitch, which are next treated as follows:—To every 100 gallons of the naphtha about 5 gallons of oil of vitriol must be gradually added and mixed thoroughly; after which 20 lb. of finely powdered peroxide of manganese must be stirred in whilst the mixture is still warm; and care must be taken that the whole does not become so hot as to boil over; the stirring must be continued for half an hour, and then the mixture left for 24 hours to cool and deposit its impurities. It must now be gently poured off from the pitchy residue which has settled at the bottom of the vessel, and the fluid well agitated with half a gallon of milk of lime, when the naphtha may either be redistilled in a common still, or, what is better, rectified through a small Coffey's still kept expressly for this purpose. This naphtha should be quite colourless, and evaporate rapidly from the palm of the hand without leaving anything but a faint and transient odour, slightly resembling that of carrots. The quantity of naphtha to be derived from different kinds of tar is very variable; thus the tar of common Newcastle coals will yield scarcely 5 per cent., whereas that from some of the finer kinds of cannel coal produces 20 per cent., and even more.

We now come to consider the treatment of the fluid pitch, which we will suppose to have been separated from most of its adhering water by subsidence from standing in a large vessel placed in a warm situation so as to maintain the pitch in a perfectly fluid state. The pitch, being heavier than the water, is pumped up from the bottom of the vessel. In this condition it must be run into an iron pot or still, provided with a refrigerator, the temperature of which should not at any time be lower than 55° of Fahrenheit. A fire being applied to the still, and cautiously increased, the fluid pitch is soon resolved into three fluids, which, as they follow each other in succession, may be collected separately at the end of the worm. First, water and naphtha, with a kind of eupione or volatile oil, make their appearance, being almost colourless or at least of a pale yellow hue, and much contaminated with naphthaline; after this, an olive or green coloured and heavier fluid begins to be evolved, which changes to a black red, and is then soon followed by a greenish yellow and thick fluid of almost the consistence of butter when cold, and in which numerous small crystals of paraffine may then be observed. The first of these products is almost worthless from the amount of naphthaline it contains, and it may, therefore, be employed as fuel; but the two last are highly interesting and important compounds, which afford, by proper treatment, an oil possessing lubricating properties no way inferior to the finest sperm oil. (*To be continued.*)

Correspondence.

DUTIES OF GAS MANAGERS.

Sir,—In your Journal of the 10th instant I perceive an advertisement headed "To Gas Engineers and Managers," wherein it is stated that an experienced gas manager is wanted for a town in Scotland, with a population of 12,000 inhabitants. His duties, it is true, are somewhat multifarious; for "he will have to act as secretary to the company, and have a knowledge of book-keeping. He will also be required to act as manager of the waterworks in the same town. It will be a recommendation to have a practical knowledge of the manufacture of naphtha."

Now, Sir, with all becoming humility, I beg to offer myself as a candidate for the above situation. I am a man with a numerous progeny; I therefore appeal to you to forward my views on the present occasion.

As I have already said, I am prepared to take the situations, although I shall be standing between fire and water. I should have no objection to act as lamplighter; and, as pedestrian exercise has been recommended to me, I should feel great pleasure (if there be a vacancy in the neighbourhood of the future scene of my labours) to act as a rural postman.

Superadded to my above qualifications, I am thoroughly conversant with the art of "getting up fine linen," which "mother" taught me in my early youth. Now, this circumstance emboldens me to trust that my claim to the kind consideration of the directors will have great weight; for, as a practical man, you must at once see all the advantages that might be made to accrue to the "concern" therefrom; for my stokers, &c., might in their leisure moments be profitably employed, under my directions and personal supervision, in ironing and "getting up" the linen of the worthy directors and shareholders of the company of which I aspire to the honour of becoming the principal agent. Nay, without any great increase of outlay (for the "plant" would be a mere trifle), we might extend our "getting up" operations so as to induce some of the worthy "12,000," whose visual organs are nightly charmed by the bright display of carburetted hydrogen, to become our customers. Now, if to this we were to add a *mangle!* what an Eldorado would——but here I must stop; the mind becomes overpowered by the mere contemplation of the fair and enchanting picture which my imagination has created; but which, I fear, my pen has but too imperfectly delineated.

No; there can be no mistake about it, *I* am the man. Take me "all in all" they are not likely to find my equal.

Paris, June 14, 1853. A Subscriber.

P.S. My present foreman, a thoroughly practical man, is so captivated with the above scheme, that he desires most ardently to accompany me. If my project meets with the approbation of the directors, it will be a very easy thing to find him a situation. He says he would have no objection to turn the mangle, and to act as turncock, &c. &c. &c. Wages low; and he always goes to bed in the *dark*.

A HINT FOR THE "BUILDER."

Sir,—The gentleman who "does" the gas department of the *Builder* is, I fear, one of those who, if "he tells a lie," feels himself bound in honour to "stick to it." That periodical, in its number for June 18, announces that "the inveterate attempts made on various pretences to prevent the laying of the new gas company's pipes at Sheffield have been foiled latterly in the Court of Queen's Bench, where a verdict has just been given in favour of the new company, who were indicted for a nuisance in breaking up the streets," &c.; whereas, it is notorious that the decision was exactly the other way, and that all operations of the new company, even to the laying of service pipes, have in consequence been suspended till an act of Parliament can be obtained. I am also enabled to state that a communication has been made to the editor of the *Builder* (the receipt of which has been duly acknowledged), giving the facts of the case, together with a report of the proceedings in the Court of Queen's Bench; but as yet no steps have been taken to correct the error into which I was at first willing to believe the editor had unintentionally fallen. This looks as if that periodical was desirous of suppressing, rather than giving publicity to, the truth.

Sheffield, July 2, 1853. Honestas.

MR. LEWIS THOMPSON ON THE ILLUMINATING POWER OF GAS IN THE METROPOLIS.

Sir,—It may be noticed that the accompanying photometrical table differs in one respect from those which I have been accustomed to give, in so far that it contains no statement of the specific gravity and rate of condensation of any of the gases. These particulars I intend to discontinue for the future: not that my belief in their importance is at all diminished, but because, having largely extended the range of my photometrical observations, I find it impossible to give details of this nature regarding each particular gas, and without which no proper parallelism can be maintained. In fact, my results in respect to the majority of the gases reported on have been gathered only with great difficulty and at some pecuniary sacrifice, though, at the same time, it has gratified me exceedingly to find the public at large so completely alive to the value of my labours, that wherever I have had occasion to apply for assistance

in procuring the gas of any particular company, it has been instantly placed at my disposal, not only with generous and friendly, but even with enthusiastic, liberality. In short, my reception everywhere has been most triumphant, and the anxiety shown on all sides to advance the cause of truth has more than ever determined me to persevere in the plain and simple path of honesty and impartial justice. So soon as it can be shown that I am in any way whatever interested in any gas company or gas concern, I must not only fall degraded from the proud position I now occupy, but, moreover, remain for ever branded with the infamy of deceit and imposture; but till then I stand alone invulnerable, and far beyond the paltry malevolence of detected imposture and disappointed fraud. If the gas companies of the great metropolis have "eyes to see and ears to hear," they must learn, from the extent of my present connections, how futile would be their attempts to arrest or even impede my line of operations. Let them be wise in time, and offer me then what facilities they are able to place at my disposal. Every gas manufacturer has, or ought to have, a photometrical apartment properly fitted up; and what I ask is, that myself, and any other persons known to be qualified for the task and willing to devote a part of their time to such a purpose, may have permission, without previous notice, to enter this apartment at convenient hours, and examine and report upon the gas in presence of any one deputed by the gas company to watch over the experiments and see justice done.

I do not ask the company to be at any expense; this they clearly have a right to be exempted from, even to the candle employed as a standard; the sole object is to obtain a correctly honest report of the different gases sold in London. And it is to the real interest of every gas company that such a report should be made; it is to the interest of the public that such a report should be published; and I, at least, know from experience, I can afford to make such a report without entailing upon myself the ceremony of passing through the Bankruptcy Court.

But, whether the gas companies like it or not, it shall be done, and "*ecce signum.*"

The gases supplied to the City have been much as usual, except that the Chartered is rather below its average, and the Central has been less impure than previously; indeed, upon several occasions I have not been able to detect any carbonic acid in it; and, curiously enough, these have been precisely the periods at which its illuminating power was highest. I cannot help remarking upon the inconsistency of Dr. Letheby, in commenting continually upon the pretended huge evil arising from sulphuret of carbon, when he altogether omits to notice the real one caused by the presence of carbonic acid in the Central gas. Even if sulphuret of carbon were ten times as obnoxious as it is, still, if no practical means can be devised for its removal from gas, what is the use of harping on this dreary string with such painful pertinacity? When once produced, it cannot be got rid of, and nothing but low heats will prevent its production. With carbonic acid the case is very different; it may, and ought to be removed, and is, consequently, a superfluous and unnecessary impurity in coal gas.

I notice a slight typographical error in the comparative table, published last month, of Dr. Letheby's experiments and my own, by the substitution of the figure 8 for a 5 in the last line; and, as this is of some importance, I think it requisite to repeat the table corrected.

1852.	Dr. Letheby. 120 grs.	L. Thompson. 120 grs.
May 11..13	sperm candles of 133 grs. =14·4	.... 12·5
Aug.10..12·7	„ 131 „ =13·86	.... 12·8
Nov.10..12·31	„ 130 „ =13·33	.... 12·2
1853.		
Feb. 11..13·8	„ 120 „ =13·8	.... 12·9
May 11..12·5	„ 120 „ =12·5	.... 12·3

I now append my altered photometrical table for the past month.

To obtain a Light from cannel gas at 6*s. per* 1000 *feet and common gas at* 4*s. equal to* 250 *standard spermaceti candles, six to the pound, and each burning* 120 *grains per hour, it would cost with the—*

Common Gases.	
Phenix Gas	4s. 0d.
Chartered Gas (Brick-lane station)	3s. 11d.
Commercial Gas / Imperial Gas (Pancras station)	3s. 10¾d.
Great Central Gas	3s. 9½d.
Chartered Gas (Westminster station)	3s. 8¾d.
Surrey Consumers' Gas	3s. 8½d.
South Metropolitan Gas / Imperial Gas (Shoreditch station)	3s. 8½d.
Equitable Gas	3s. 6¾d.
City Gas	3s. 6½d.
Imperial Gas (Fulham station)	2s. 9½d.
Cannel Gases.	
Chartered	2s. 8½d.
Equitable	2s. 6½d.

Therefore, if the actual worth of 1000 cubic feet of

The Phœnix gas be taken at		4s. 0d.
The Chartered gas (Brick-lane) will be worth		4s. 0¾d.
The Commercial gas / The Imperial (Pancras) gas	do.	4s. 1¼d.
The Great Central gas	do.	4s. 2¼d.
The Chartered gas (Westminster)	do.	4s. 3d.
The Surrey Consumers' gas	do.	4s. 3¼d.
The South Metropoliran gas / The Imperial gas (Shoreditch)	do.	4s. 4d.
The Equitable Common gas	do.	4s. 5½d.
The City gas	do.	4s. 6d.
The Imperial gas (Fulham)	do.	5s. 8½d.
The Chartered Cannel gas	do.	8s. 11½d.
The Equitable Cannel gas	do.	9s. 6½d.

Daily Record of Observations upon the illuminating power of a burner consuming 5 *feet per hour of the Gases mentioned below, as compared with a spermaceti candle, burning about* 120 *grains per hour, but always reduced to this gravity by calculation.*

Date.	Cannel Gas.		Common Gas.												
	Equitable Company.	Chartered Company.	Imperial Company. Fulham.	City Company.	Equitable Company.	Imperial Company. Shoreditch	South Metropolitan Comp.	Surrey Consums. Company.	Chartered Company. Westmins.	Central Company.	Imperial Company. Pancras.	Commercial Company.	Chartered Company. Brick Lane	Phœnix Comp.
June 10				13·5						12·8			12·6	
11			16·7	13·3						12·2			12·	
13				13·3						11·4	12·5	12·2	11·4	
14				14·						12·5			12·	
15				13·7						12·5			11·8	
16				13·9						12·8	12·4		12·6	
17		27·2	17·3	13·8					12·8	12·7			12·7	
18				13·8						12·6			12·	
20	28·			14·	13·3					13·7	12·6		11·	
21				14·1						13·9		12·5	12·5	
22			17·7	13·9						13·9			12·4	
23				14·5						13·7	12·5		11·6	
24				13·2						13·1			11·5	
25				14·						12·6			13·	
27				13·6			13·1	13·		12·6			11·8	12·1
28				13·7						12·4			12·4	
29	29·	27·4		13·7	13·3				13·	12·4	12·		13·1	
30				12·9			13·3	13·1		11·7			11·7	12·2
July 1				12·5		13·1				11·9		12·6	11·9	
2		26·6		13·2					12·8	12·3			12·5	
4	28·2			13·6	13·4	13·				12·5			12·5	
5				13·4			12·9	12·9		12·6	12·7		12·8	12·1
6			17·6	13·6						13·			13·6	
7				13·2		13·2				12·5			12·3	
8	29·6			13·7	13·9					12·6			12·8	
9				13·9						12·7			12·8	
Average	28·7	27·1	17·3	13·6	13·5	13·1	13·1	13·	12·9	12·7	12·4	12·4	12·3	12·1

No. 7 A, *Pancras-lane, City, July* 11, 1853. Lewis Thompson, M.R.C.S., &c., Consulting Chemist.

DOINGS AT THE MANSION-HOUSE.

Pray, Sir, can you inform me what was "going on" at the Mansion-house this afternoon, whilst the Sheriff of London's state coach and a well-known dry gas-meter manufacturer's state delivery van were both standing at the private entrance, the latter partially loaded with experimental dry meters, governors, photometers, gas-burners, &c. &c.? My attention was drawn from the lace, lacquer, and gilding of the liveries, coach, and van, by the sudden emergence of a workman from the portals of his civic majesty's palace, bearing a liliputian dry meter and wet governor, which, being safely stowed away in the state van, it was driven off amidst the speculations of the crowd as to what had been "going on" inside. Can you throw any light upon the matter? Q. E. D.

City, July 1, 1853.

[We had received no invitation, and, consequently, were not present at the proceedings, which were doubtless intended to puff some particular gas-meter into greater notoriety.]

Register of New Patents.

William Hunt, of Stoke Prior, Worcester, manufacturing chemist, for "*Certain improved modes or means of producing or obtaining ammoniacal salts.*" Patent dated Sept. 30, 1852.

The object of this invention is to obtain sulphate of ammonia from the ammoniacal liquors of gas works; and this is effected by causing the liquors to traverse a column or condenser filled with pebbles and coke, and to be brought in contact with sulphurous acid gas, which may be obtained by calcining pyrites of any description, so as to drive off the sulphur therefrom. The sulphurous gas may be introduced at the top of the column, and descend with the falling liquid, or at the bottom, and be drawn upwards by the draught of a high chimney; in either case care being taken to cool the gas previous to its coming in contact with the ammoniacal liquor. The result of the action of the gas is to convert the ammonia present to a sulphite of that base from which the sulphite may be obtained by subsequent evaporation and exposure to air, by which oxidation will be induced and the chemical change effected.

Instead of using sulphurous acid gas, the spare gas from vitriol chambers, which consists of a mixture of sulphuric, sulphurous, and nitric acid, may be advantageouly employed.

The claims are for—

1. The apparatus described, or any modification thereof, wherein the ammoniacal liquors are treated with sulphurous acid; and

2. The application of the spare gas from vitriol chambers in the production of salts of ammonia.

Freeman Roe, of the Strand, London, hydraulic engineer, for "*Improvements in valves and cocks.*" Patent dated Oct. 1, 1852.

This invention has for its object, first, improvements in cocks where ball-valves are used; second, in arranging valves or cocks for supplying a measure quantity of water; and, third, in the construction of sluice cocks or hydrants. The peculiar method adopted under the last head consists in forming dovetail grooves, recesses, or narrow openings in the working parts of such cocks, for fixing the seats of the valves, and casting or fixing therein gutta percha, or metal of a different kind to the body of the valve (where a facing of another kind is required), so that the gutta percha or metal will produce a fixed working surface. Under this head he claims the facing, together with the general arrangements and combination of the whole valve, so that the faces may be taken out to repair, by removing the bonnet of the valve; he also claims the peculiar mode of arranging and facing valves and parts.

William Edward Newton, of the Office for Patents, 66, Chancery-lane, for "*Improvements in governors or regulators for regulating the pressure of gas as it passes from the main or other pipes to the burners.*" (Being a communication.) Patent dated Oct. 2, 1852.

This invention relates to a method of regulating or governing the pressure of gas at the burners, so that the gas may issue therefrom with a regular pressure, irrespective of the varying pressure in the main, and of the number of burners used. It is known that the pressure of gas in the main changes considerably from various causes, and that this variation is increased in the branches by the varying quantity of gas consumed; and it is also known that these variations are wasteful of gas.

According to the present invention, the varying pressure of the gas is balanced in the main, by connecting with the valve a disc, or balancing-surface, equal to the surface of the valve; so that, whatever may be the variation of pressure in the main, the valve will be in equipoise, so far as regards that pressure—when this is combined with a mode of governing the size of the aperture through which the gas passes to the branch, by the pressure of the gas beyond the valve; so that, when that pressure increases, the valve will be carried towards its seat to reduce the supply, and hence the pressure, and *vice versâ*; which latter mode of regulation is effected either by the pressure of the gas on the face, which would tend to close it, and acting against a weight, or its equivalent, which tends to open it, and which can be set or adjusted to any desired pressure; or by causing the gas in the branch to press on the surface of a disc, in addition to the valve, so as to present a larger surface to the pressure of the gas; the better to effect the regulation of the supply, and hence the pressure at the burners.

Fig. 1 represents an improved governor in sectional elevation; A, is a vessel connected at its lower end with the main, and at the upper end with the supply pipe. This vessel is connected with another vessel E, by a neck or passage C, so that the gas in the main shall have free access to the lower part of both vessels. About the middle of the vessel A, there is a stricture *g*, *g*, to which is fitted a valve-seat *a*; and to this is fitted a disc-valve *m*, provided with a central stem *n*, jointed to one arm of a lever *c*, which rocks on a fulcrum-pin, sustained in bracket-pieces *b*, *b*. The stem *n*, of the valve should be made of sufficient weight and length to keep the surface of the valve in a horizontal plane.

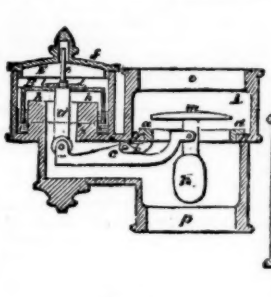

Fig. 1.

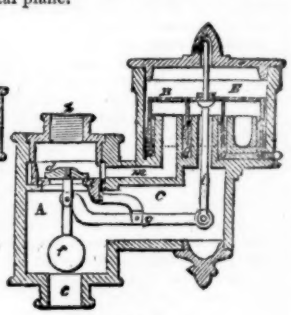

Fig. 2.

At the opposite end of the lever *c*, to that which carries the valve *m*, is jointed a rod *d*, which is kept in a vertical, or nearly vertical, position, by having its upper end *e*, of a reduced size, and fitted to slide in a recess or hole in the cap *f*, of the vessel E. To this rod is secured a disc B, with a rim which is plunged in mercury, or other suitable fluid, contained in an annular cup *i*, formed in the vessel E, by an inner rim *h*. The upper end of the rod *d*, is formed to receive weights *l*, which can be put on and taken off at pleasure, by unscrewing the cap *f*.

The gas in the main has free access to the under surface of the disc B, and of course to the under surface of the valve *m*; and these being hung to the opposite ends of the lever C, and presenting an equal surface, whatever may be the pressure of the gas in the main, it must be equipoised—the pressure under the disc being precisely equal so the pressure under the valve.

The weights *l*, on the disc are regulated to keep the valve open against any desired and determined pressure above the pressure of the atmosphere; so that, whenever the gas in the branch—that is, the gas beyond the valve—exceeds that pressure, it will act on the upper surface, and force it down gradually; reducing the aperture for the passage of the gas, until the gas is reduced to the determined tension; and then the valve is again lifted by the preponderance of the weights *l*, on the disc.

Thus it will be seen that, whatever may be the varying pressure of the gas in the main, it never can affect the regulation; because it is balanced, and therefore leaves the valve to be governed in its position, to regulate the flow of gas from the main into the branch, by the pressure of gas in the branch; the degree of which pressure is determined by the weights. When the rim on the disc dips in mercury, or other suitable fluid (mercury being preferred), the valve *m*, rises, and forces this rim into the mercury; its weight on the lever is thereby reduced, and *vice versâ*. To compensate for this, the arm of the lever *c*, to which the valve *m*, is jointed, is bent up, so that, as the valve rises, and the rim of the disc is forced into the mercury, the valve-arm of the lever shortens, and loses its leverage in the same ratio that the disc loses it weight.

Fig. 2 represents, in vertical section, the improved apparatus, above described, with an additional element. The vessel A, is connected with the main at *c*, and with the house branch at *b*, and is provided with a valve-seat *a*, which is fitted to a rim or stricture *l*, and secured in its place by the screw-cap *b*, which forms the connection with the branch. The valve *d*, is fitted to the valve-seat *a*, and provided with a central rod and weight *f*, by which it is jointed to the lever *g*, and by which it is kept in a horizontal position. The vessel E, communicates with the vessel A, below the valve by the neck C, and above the valve by a passage *m*. And this vessel E, is formed with two annular cups *p* and *q*, to contain mercury, or other suitable fluid, and to receive two rims *r* and *s*, on the disc B. The annular cups communicate with each other by lateral passages *t*, so as to keep the mercury in the two cups at the same level. The disc is connected with the lever *g*, by the vertical rod *i*, which is guided by playing in a hole in the cap *h*, as before described.

The surface of the disc within the inner rim *s*, and exposed to the pressure of the gas in the main, should be exactly equal to the surface of the valve exposed to the gas in the main, so as to balance this pressure, whatever it may be, and however much it may vary; and the surface of the disc between the inner and outer rims *r* and *s*, and presented to the pressure of the gas in the branch, should be made so large that the pressure of gas in the branch shall act upon this in addition to the upper surface of the valve; for the greater the surface exposed to this pressure, the more sensitive will be the instrument. The rod of the disc must, as in the first example, be weighted, to suit the pressure of gas required in the branch. The pressure of the gas in the main being balanced on the valve and disc, it is evident that the valve will be kept open by the preponderance of the weight on the disc end of the lever, until the pressure of the gas in the branch exceeds the determined degree; and then it acts on the surface of the disc between the two rims, and on the top of the valve; and, having a large surface to act upon, immediately begins to move the valve towards its seat—thereby gradually reducing the aperture for the passage of the gas, until the proper tension is restored, and *vice versâ*.

The advantage which this arrangement has over the one first described is, that by the addition of the element of presenting the disc to the pressure of the gas in the branch, as well as in the main, the pressure of gas in the main is neutralised, as in the first plan; but a much larger surface is presented for the pressure of the gas in

the branch to act upon, to close the valve, whenever the pressure exceeds the degree to which the instrument is set. The instrument last described can be made as sensitive with a very small valve as the other with a very large valve; and, therefore, the latter plan is better adapted to dwelling-houses, and other localities supplying a very limited number of burners.

From the foregoing it will be seen that the instrument once set to a given pressure, the gas will issue from the burners constantly at that pressure, without regard to the variation of the pressure in the main, or the number of burners in use. It will be obvious that instead of making the two arms of the lever of equal lengths, and the surfaces of the valve and disc, which are exposed to the pressure of the gas in the main, equal, this may be varied, and one arm made longer, by making the surfaces inversely of corresponding proportion.

The patentee claims balancing the varying pressure of the gas in the main by connecting with the valve a disc which receives pressure from the main to balance the pressure on the valve, substantially as described, in combination with the method of governing the aperture through which the gas passes to the branch, by the varying pressure of the gas beyond the valve which governs the aperture, as described; so that, when the pressure becomes too great, the aperture shall be reduced, and *vice versâ*. And he also claims, in combination with the above, making the disc so that it shall be also acted upon by the varying pressure in the branch, to assist in moving the valve to govern the aperture for the passage of the gas, substantially as specified; whereby the action of the instrument is rendered more sensitive and prompt as a governor.

Francis Warren, of No. 16, Millbank-street, Westminster, for "*Improvements in gas-burners.*" Patent dated Oct. 6, 1852.

This invention consists in applying to argand, fishtail, batswing, and other forms of burners, a wire or wires to divide the flame and be kept heated by it, by reason of the wire or wires being within the flame, thereby obtaining more complete combustion of the gas. The drawings show an argand burner, a fishtail burner, and a batswing burner, to each of which is applied a wire; but more than one wire may be applied to a burner. The ends of the wires enter sockets on each side of the burners, by which means they may be readily applied and removed, the holes in the sockets being formed or drilled in such manner as readily to receive the ends of the wires and to allow them to slip or pass freely therein; and, as there is elasticity in the wire, that portion which crosses through the flame may be placed higher or lower by forcing the ends of the wire less or more into the sockets; or the sockets may be made separate from the burners, and have female screws formed therein, suitable to screw into male screws formed on the outside of the burners, by which means the position of the wires in the flames may be adjusted by screwing the sockets higher or lower on to the male screw on the outside of a burner. This form of burner is stated not to be applicable to the combustion of cannel-coal gas.

The patentee disclaims the application of the wire as above described to a jet burner, but claims its application to argands, fishtail, batswing, and such-like gas-burners.

D. Laidlaw, Glasgow, for "*Improvements in the manufacture or production of gasburners.* Patent dated Oct. 11, 1852.

Instead of iron, brass, or porcelain, ordinarily used as the materials from which gasburners are generally made, the patentee uses such metals and alloys as are easily fusible—as tin, or tin and regulus of antimony. The metal is cast or moulded to the required form of burner, or nearly so, in metal or other moulds, so contrived with cores or mandrils that the bore of the burner may be formed in the act of casting, leaving the actual egress apertures for the gas to be drilled; and either the main bore alone, or the smaller egress apertures for the gas, also, may be so produced in this way; or the actual egress openings for the gas at the point of combustion may be formed by subsequent cutting or drilling in the usual manner. By this means the burner may be produced entirely by casting, or so as to require only a slight amount of labour and attention subsequently. Any metal or composition capable of being cast with facility in this manner in separate moulds, and possessing the advantage of freedom from oxidation and deposit, may be used; and for some purposes the orifice and portion exposed to the flame is gilt or plated, or otherwise treated with a defensive casting of gold, silver, or other metal or material, as a preservative covering; similarly a nib of glass, china, or other incorrodible substance, may be inserted into the top of a burner, so as to protect the body thereof, whether such burner is made upon the old or according to the new process.

William Chisholm, of Cornwall-place, Holloway, chemist, for "*Improvements in the purification of gas, and the obtention of certain products during the process of such purification.*" Patent dated Oct. 14, 1852.

The process consists in using charcoal—either vegetable, animal, or what is called mineral charcoal, from bituminous shale—combined with chemical agents, capable of decomposing and absorbing the impurities contained in such gas.

The patentee uses charcoal, combined with such chemical materials that, when the mixture thus composed has fulfilled its office of purifying the gas used for illuminating purposes, it shall have attained a value as a rich manure as hereafter described. Charcoal may be used alone for purifying gas, or with acids combined with alkalis, or acid, or water only.

The patentee proposes, firstly, to take charcoal made from peat, or peat partially charred, or charcoal made from algæ (seaweed) either in blocks, or coarsely powdered or finely ground; in the first process it is preferred to use peat charcoal, to which add chloride of sodium (common salt), and commercial super-phosphate of lime. This mixture will be placed in that vessel well known in all gas works as the dry-lime purifier, and the gas is to be made to play through it in a similar manner, which, being effected, a decomposition takes place; the chloride of sodium is decomposed by the hydro-sulphate of ammonia contained in the gas, a hydro-chlorate of ammonia and hydro-sulphate of soda are formed; the hydro-sulphate of soda and phosphate of lime are taken up by another portion of the hydro-sulphate of ammonia, and converted into phosphate of soda and lime. The sulphate of lime contained in the commercial super-phosphate of lime is also decomposed by the ammonia of the gas being converted into sulphate of ammonia. The hydrogen of the hydro-sulphate acid (sulphuretted hydrogen) will be seized upon by the oxygen of the charcoal, forming water, and setting the sulphur free, and the gas is thus purified. The principal constituent parts of peat charcoal are carbon, iron, alumina, silica, and alkalis. To the charcoal is added a super-phosphate of lime and chloride of sodium, the acids of which seize upon the volatile ammonia contained in the gas, forming a phosphate of lime and phosphate of soda; and the ammonia, a hydro-chlorate of ammonia, a sulphate of ammonia, and a sulphate of lime, and a hydro-sulphate and sulphate of soda and lime, together with the other minor impurities in the gas, forms a compound possessing in a high degree the elements necessary for promoting the growth of plants. A variety of chemical compounds may be used in combination with charcoal, such as are well known, to fix or decompose ammonia, as the oxysalts, chloride of calcium and magnesium, potassa, and nitrates.

PROPORTIONS.	
Chloride of sodium	60·
Super-phosphate of lime	294·
Algæ (seaweed) charcoal	224·
Peat charcoal	442·
	1000·

Instead of chloride of sodium, bisulphate of potassa may be used, or in combination with the chloride of sodium and sulphate of magnesia. When the gas has passed through this mixture, the resulting compound will be phosphate, sulphate, and carbonate of ammonia and potassa, phosphate of lime, phosphate of magnesia and lime, a sulphate and a carbonate of lime, oxide of iron, alumina, chloride of potassium, carbon. This process will produce a manure analogous to guano.

PROPORTIONS.	
Super-phosphate of lime	196·
Bisulphate of potassa	128·
Chloride of sodium	60·
Sulphate of magnesia	69·
Charcoal	347·
Ammonia	200·
	1000·

Secondly, when gas contains much hydro-sulphuric acid, it will be desirable to have two purifying vessels, one to take up the ammonia, and the other the hydro-sulphuric acid. The peat charcoal for the hydro-sulphuric purifier should be selected so as to contain considerable portions of mineral substances. The gas is passed first through the ammonia purifier, the ingredients as firstly described, and then into the hydro-sulphuric vessel which contains the charcoal as above mentioned. On its passage through the latter, the oxygen of the charcoal will seize upon the hydrogen of the hydro-sulphuric acid, forming water and depositing the sulphur. When the charcoal has become exhausted—that is, when it ceases to decompose hydro-sulphuric acid—the gas should be turned off, and a column of air, moistened with a jet of steam, forced through it, until its properties are partially or wholly restored. This process may be repeated until the deposit of sulphur becomes inconveniently large. By this process the hydro-sulphuric purifier, even in the largest establishment, need be but rarely opened. In passing the moist air through the hydro-sulphuric purifier, the communication with the ammonia purifier must be kept open, because the moist air forced through the charcoal, which has been exhausted of its oxygen to decompose the hydrogen of the hydro-sulphuric acid, is, in its turn, decomposed by the oxygen of the water combining with the charcoal, while the hydrogen combines with the nitrogen of the air. Ammonia is thus formed and fixed in its passage through the ammonia purifier. The reoxydising process may be applied to any material now in use at gas works for depriving the gas of its hydro-sulphuric acid; and to produce ammonia it may be used with or without the steam, but the patentee prefers it with

Thirdly, charcoal, when saturated with a solution of hydro-sulphurate, sulphuric acids more or less diluted, will purify illuminating gas, converting its ammonia into hydro-chlorate, sulphate, or nitrate of ammonia. The application of diluted acids in the purification of gas is well known and has been long practised; but its combination with peat charcoal has never hitherto been used. It is always an objection to pass gas through liquids, as washing injures its illuminating power; it was also found that the gas, in passing through the acidulated mixture, carried along with it free acid, which was very objectionable. All this is avoided by the peat charcoal; for, although it absorbs nearly four times its own weight of the acid solution, still the gas passes through it as if it were but a dry substance, not depriving the charcoal of its moisture, but rendering up to it all its ammonia. If animal charcoal is used with the acid solution instead of vegetable, a very rich manure will be the product. The water in the hydraulic main, and through which gas flows in its passage from the retorts, and known by the name of gas or ammoniacal liquor, contains, as is well known, a considerable quantity of ammonia in a state of carbonate and hydro-sulphate. This liquor may be entirely absorbed either by the charcoal alone, or by any of the combinations with the chemicals, as before described. For the purification of gas, it will require about two pounds by weight of charcoal, or the mixture of charcoal and chemical compounds, for each gallon of gas or ammoniacal liquor. The superabundant water may be thrown off either by exposure to the air, or by passing a current of hot air through it, or by any artificial means. When dried it may be employed again

by absorbing another quantity of the gas or ammoniacal liquor; and this may be repeated until such time as the charcoal and chemicals have absorbed any given quantity of ammonia required. The quantity of ammoniacal salt obtained from each gallon of gas or ammoniacal liquor may be estimated at about eight ounces; care must, therefore, be taken that the quantity of chemicals are in sufficient quantity to decompose or fix the ammonia. For instance, in drying the charcoal mixture that has been saturated with gas or ammoniacal liquor, if the vapour thrown off stains turmeric paper brown, it shows that ammonia is escaping; there must be added, therefore, to the mixture super phosphate of lime, or chloride of sodium, or bisulphate of potassa, or any of the chemicals before mentioned to fix or decompose the ammonia. The gas or ammoniacal liquor has an exceedingly offensive smell, but when the charcoal mixture has been added to it, it is deodorised: its hydro-sulphuric acid is decomposed, its volatile ammonia is fixed, and in drying, the simple vapour of water escapes, having no disagreeable odour whatever.

In the various modes stated for purifying gases, the use of peat charcoal is recommended from its great abundance, from its cheapness, and because it can always be procured with such natural combinations as are requisite to purify or deprive gas of its impurities; for instance, for depriving gas of ammonia the patentee uses a peat charcoal rich in phosphates and alkalis; if for hydro-sulphuric acid, the charcoal should contain, by analysis, peroxide of iron and other substances capable of decomposing that acid.

In explaining the chemical changes that take place, as in the first part of this invention, where it is stated "the oxygen of the charcoal," the patentee means a charcoal containing substances capable of parting with a portion of their oxygen.

Walter Ricardo, of the firm of A. and W. Ricardo, of London, sharebroker, for "*Improvements in gas-burners.*" (A communication.) Patent dated Oct. 14, 1852.

The specification declares that whereas there is at present in common use a gas-burner (called a batswing burner), which has a single slit, through which the gas issues in a flat stream or sheet; and also another kind of burner (called a fishtail or union jet burner), which has two small orifices, through which the gas issues in two diverging jets or thread-like streams.

The present improvements consist in forming gas-burners with two or more slits, through which the gas issues in two or more flat streams or sheets. These slits may be either parallel, when the issuing streams of gas will also be parallel; or they may be inclined to each other at any such angle or angles that the streams of gas issuing through them may converge and meet together. In either case, the gas, when ignited, produces a single flame, from which more light is evolved in proportion to the gas consumed than is obtained from burners of the ordinary construction.

The drawings annexed to the specification represent the improved burners constructed according to the said invention.

One of them represents an external elevation and section of a burner with two parallel slits. Another represents an external elevation of a burner having three such parallel slits. The streams of gas are in each of these cases parallel.

Burners with four or any greater number of slits might have been represented in the same manner. Other drawings represent an external elevation and section of a burner with two slits inclined to each other, so that the sheets or flat streams issuing through them converge and meet together.

Burners with three or any greater number of such inclined slits might have been similarly represented.

The slits are to be formed so as to communicate with the central channel or chamber of the burner, as in the batswing burner; but the patentee prefers that, as to their size, they should be rather narrower than the slits in the batswing burner, by which I mean that they should allow thinner sheets of gas to pass through them.

These slits may be either any or all of them parallel to the axis of the burner, or inclined to it at any angle or angles, provided that their flames, and therefore the streams of gas, are either parallel, or converge and meet in one line; and the patentee prefers that this line, towards which the streams converge, and in which they meet and coalesce, should be very near to the end or top of the burner.

Claims.—1. The manufacturing of gas-burners, with two or more parallel slits at their ends or tops, so that the gas may issue through them in parallel sheets or flat streams.

2. The manufacturing of gas-burners with two or more slits at their ends or tops inclined towards each other, that the issuing sheets or flat streams of gas may converge and meet together, forming a single flame.

Henry Brock Billows, of the Curtain-road, London, for "*Improvements in the construction of gas-burners for illuminating and heating purposes.*" Patent dated Oct. 30, 1852.

These improvements in gas-burners consist, firstly, in arranging or combining together two or more of the ordinary burners known as fishtail or batswing burners, so that the two or more flames blend and form one flat uniform flame, giving increased illuminating power. The drawing, accompanying the specification, shows an end view of the combined burner, and a side view of the same. It consists of two tubes, fitted to a central tube; the two tubes turning freely within the central tube, and, by this arrangement, they can be adjusted so as to burn either separately or combined. It is, however, when the jets touch each other that the increase of its illuminating power takes place, and this is partly due to the peculiar form of jets used with these burners. In most of them the orifices of the emission of gas are cut at an angle, so that one stream of gas impinges upon another, which the patentee finds greatly increases the light.

The improvements consist, secondly, in applying to the ordinary argand burner a central tube with a single jet burning within the hollow flame, and also the application of regulating screws for adjusting the height of each flame. Instead of the ordinary perforated argand burner, the patentee uses two concentric rings cut out of metal, and fitted within the brass ring of the burner. One of the figures represents the form of a glass for producing musical sounds from a gas-burner, and by arranging a series of these glasses upon burners—some cylindrical at the tops, others trumpet-shaped, with the lower aperture adapted to produce a certain note—they form a novel harmonious instrument, the bottom of each burner being made to rise and fall by a small lever, so as to control the various notes.

The improvements relate, thirdly, to burners adapted for consuming a mixture of coal gas and atmospheric air, to be used for heating and culinary purposes. This burner consists of an iron tube of from six to nine inches in length, by a half to three quarters of an inch in diameter, the upper end being enlarged so as to increase the surface at the point of ignition, and more effectually allow the air to mix with the gas; the lower end is left open to admit the air. Instead of using wire gauze to prevent the flame passing down the tube, the patentee makes a coil formed of strips of the same metal, having a corrugated surface, by passing it through grooved rollers; this arrangement allows a free passage for the mixed gases, but effectually stops flame. This coil is driven tightly into the upper part of the tube, resting on a perforated metal plate. The tubes may be either circular or square at the upper end, but the patentee prefers the former; if square tubes are used, it will be necessary to cut the strips of metal in short pieces the depth of the aperture, placing the corrugated and plain metal alternately. In case where the cheerful appearance of the ordinary fire is desired in a gas stove, it is accomplished by inserting in the centre of the coil a bunch of asbestos, and for this purpose a space should be left in the centre of the coil. The application of a series of these to an ordinary gas-cooking apparatus is shown, the burners being arranged in recesses at the sides, the heat passing off to the upper part of the oven; the burners may be used either with or without asbestos. An arrangement of burners is also shown, adapted for a register stove; the tubes are inserted in an iron casting made to receive them; the patentee prefers a shell pattern for this casting, the inner surface enamelled with porcelain. He also adapts a parabolic reflector to form the back of the stove, made either of silvered glass or metal.

It will be obvious from the foregoing that the minor details of the invention may be greatly varied without departing from the principle of the same. The patentee does not, therefore, confine himself precisely to what is shown and described in his specification; but claims as his invention the burners and parts connected therewith, adapted for heating and lighting substantially as therein described and shown.

Donald Grant, of Luton-place, Greenwich, for "*Improvements in the means of applying the heat derived from the combustion of gas.*" Patent dated Oct. 14, 1852.

This invention relates to certain means of economising the heat given off by the combustion of gas in a gas-stove. This object is in part attained, in stoves used for heating apartments, by passing currents of fresh air, taken direct from the outer atmosphere, up heated flues or pipes, which are open at top to allow of the air, when heated, to flow into the apartments. In cooking-stoves, the heat, which would otherwise pass off to the chimney, is utilised by surrounding a burner (such as that which is ordinarily employed for heating a stew-pan or boiling a kettle) with a coiled pipe, connected at both ends with a boiler or other receptacle for liquid; and, by this means, a circulation is created in the liquid at the expense of the radiated heat, which would otherwise be lost—the vessel, which is set above the burner, being heated by the direct action of the flame. A further economy of the heat given off by gas-burners is also effected by using glass or earthenware panels, of a peculiar construction, as hereafter explained. The outer case of the heating stove is composed of a frame of angle iron, which is set upon a plinth made of wood, stone, or other bad conductor of heat, and is filled in with panels composed of slips of glass or earthenware piled up one upon the other, and forming a good non-conducting filling to the frame. The vertical bars of the metal frame are each provided with a groove, of sufficient width to receive the ends of two slips of glass or earthenware, when laid face to face. These slips are, by preference, not deeper than from two to three inches, and they are built up in the grooves in two lines, arranged so that one line shall break joint with the other. The object of using these slips is to provide a means of rectifying, at a small expense, any damage that may arise to the panelling, the probability being, that when an accident occurs thereto it will be confined to one or two slips, which may be readily replaced; instead of necessitating the insertion of a new panel, which is requisite when a single plate of non-conducting material is employed to fill a panel. At the bottom part of the stove within the plinth is an air-chamber, which is divided into two compartments. These chambers are supplied with air by separate channels, the air being drawn direct from the outer atmosphere. The top of one of the compartments of the air-chamber is pierced with a ring of holes for the admission of air to the burner; and holes are also made in the top of the other compartment, to allow of the passage of air upwards. Over these latter holes earthenware tubes are placed, for the purpose of conducting up the air to be heated, and passing it out at the top of the stove. These pipes project through a plate riveted to the frame of the stove, and are held in position by that plate. Above the plate, and resting upon a ledge provided to receive it, is a glass or earthenware cover (composed of slabs or tiles), and pierced with holes that are concentric with the earthenware tubes for allowing the air, which flows up those tubes, to escape into the apartment. A junction is made between the tubes and this cover by cap-pieces, which fit on the tubes and into the holes in the cover; or the tubes themselves may be continued to the cover and cemented thereto. Suspended over the burner, and supported by the plate, is a bell-shaped conductor, which guides the gaseous products of combustion to an earthenware tube in connection with the chimney. This tube may be surrounded, if thought desirable, by a casing, composed of angle iron and slips of glass or earthenware.

In order to generate heat by this stove, the air supply-pipe is

opened by turning a cock, and the gas is turned on and lighted. The damper of the pipe is then opened, and air is admitted into the compartment, whence it rises up the earthenware tubes, which are subjected to the heat of the gas-burner; and, the temperature of the air becoming thereby elevated, it passes out at the top of the stove and warms the apartment. It will now be understood that fresh air of an elevated temperature may be thrown into an apartment in any required quantity (such temperature being regulated by the quantity of air admitted into the tubes), and that without the possibility of the air being injuriously affected by admixture with gas or contact with heated metal. It will also be seen that, as provision is made for a complete command over the supply of air, just the amount that is required to support combustion may be admitted to the burner, and too great a draught up the chimney prevented.

The improved cooking-stove is shown, which retains the heat within the casing, so that the patentee employs but one current of air, which is supplied, in the ordinary manner, to support the combustion of the gas. The casing is constructed as already explained with respect to the heating-stove. In this stove double doors are employed; the inner one of which is made of glass, to allow of the attendant inspecting the viands (to ascertain the progress of the cooking), and prevent the necessity for the frequent opening of the door; which, by permitting access of cold air, greatly retards the cooking operation; the second door is of earthenware, and is intended merely to prevent the radiation of heat. The burner is situate (for the purpose of baking) in the lower part of the stove; and at the upper part of the oven a horizontal flue is made, the entrance to which is near the front of the stove. The design of this flue is to prevent the sudden escape, from the stove, of the heated gases, which, by being led along the top of the oven, render the heat thereof more equable, and also to check the action of any downward draught that may be set up in the chimney. Over the oven, but enclosed in an upper compartment or second chamber, is a burner suitable for boiling a kettle, heating a stewpan, &c.; and surrounding this burner is a coiled pipe, the ends of which are connected by union joints to a boiler mounted on a bracket carried by the stove-frame. This pipe is intended to take up the waste heat from the burner, and transmit it to water or other liquid contained in the boiler. The heating of the water in the pipe will, as is well understood, cause the water contained in the boiler to flow into and through the pipe and re-enter the boiler, so long as the gas is kept burning. By this means water may be kept hot, when boiling or such-like operation is being performed, without the consumption of more gas than is required to effect that operation.

The patentee claims—First, the general arrangement and construction of stove for heating apartments, as above described.

Secondly, supplying gas-stoves with two distinct currents of air, for the purposes above set forth, when such streams are capable of being regulated respectively to suit the requirements of the apartment to be warmed, and of the burner employed in the combustion of the gas.

Thirdly, constructing the panels of gas-stoves, as above explained.

Fourthly, with respect to cooking-stoves, the use of double doors; the inner one being filled with slips of glass, for the purposes above set forth; and also the horizontal flue for equalising the heat in the oven.

Fifthly, the application thereto of the coiled pipe, whereby the water or other fluid may be heated, in an adjacent boiler, by the waste heat of a gas-burner employed for another and a distinct purpose.

Charles Dickson Archibald, Esq., of Rusland-hall, in the county palatine of Lancaster, for "*Improvements in lighting and heating.*" Patent dated Nov. 2, 1852.

This invention consists in certain means of rendering atmospheric air luminiferous and capable of combustion, by passing it through hydrated mixtures of hydro-carbons, or by passing it through hydro-carbons after being first thoroughly saturated with aqueous vapour.

Previous attempts to render atmospheric air luminiferous have proceeded upon the presumption that it should be dry or warm; but the patentee has discovered that, to attain the best results as regards light and heat, the complete hydration of the air is an essential condition. Where atmospheric air in its normal state is passed through volatile hydro-carbons, the process of vaporisation that takes place reduces the temperature to such a degree as to render necessary the application of extraneous heat to the reservoir of the hydro-carbons, or to the current of air itself. The consequence is a constant change of temperature, and a corresponding vacillation in the combustion of the air; and for all economical purposes the modes hitherto employed have proved of little or no value. For the purpose of rendering atmospheric air suitable for illuminating purposes, the patentee finds it necessary to saturate it with aqueous vapour, which may be done by causing it to pass through vessels filled with water; but practically he finds that the same results may be attained by adding water in considerable quantity to the mixture of hydro-carbons. The hydro-carbons which he prefers to employ are, naphtha, benzole, or other volatile fluid hydro-carbons, and various compounds or mixtures of these, with alcohol, aldehyde, and wood spirit, or their equivalents; and to such mixture he adds a certain quantity of water, as after mentioned. This mixture he introduces into a close vessel provided with the needful pipes and stopcocks; and he finds it convenient to stuff the vessel with sponges, cotton waste, or other substances capable of exerting capillary attraction. The air, in passing through this vessel, first takes up a quantity of aqueous vapour, and thus seems to become capable of dissolving the benzole or other hydro-carbon, or of transferring and carrying it forward to the burner. Whether or not it is due to the quantity of latent heat which the water contains, the process goes on without any injurious diminution of temperature.

For the purpose of obtaining light, he prefers a solution of benzole in common alcohol, in the proportion of one of benzole to two of alcohol. In passing atmospheric air through such a mixture, the effect would be that the alcohol would extract the small quantity of moisture which the air contained, and yield up the combined vapours of the mixture, so as to cause rapid evaporation and consequent diminution of temperature. To avoid this, he at once saturates the mixture with water, and in practice he adds 1½ measure of water, or until the mixture of benzole and alcohol becomes milky: thus—

Benzole	1
Alcohol	2
Water	1½

He finds this combination or solution of hydro-carbon spirit and water has the property of rendering the atmospheric air passed through it highly luminiferous, and that the process may be continued without interruption so long as any benzole remains in the vessel.

He also finds in practice that the water and alcohol, or other spirit, are not consumed, or rather that the consumption of these elements goes on very slowly, and that it is only necessary, from time to time, to renew the benzole or other hydro-carbon; after considerable time, however, small additions of water and spirit improve the mixture.

The employment of water in the manner specified not only overcomes the practical difficulties which have hitherto prevented the use of atmospheric air as a source of light, but it also adds greatly to the brilliancy and beauty of the flame. The gas thus produced is permanent in its character, may be collected over water, and retained in reservoirs without deterioration; it may be used, like common coal gas, for the illumination of dwellings, factories, streets, squares, and cities; for lighthouses, signals, and indeed for every purpose for which artificial light can be required; and it has the great recommendation of being entirely free from danger of explosion.

The gas may either be burned in its nascent state, or at any time after production, with perfect safety, and may be conducted in pipes to any distance. Even at any temperatures there is no sensible depreciation of the brilliancy of the light, and no deposition in the pipes or tubes. In point of economy it will compare favourably with any gas or other source of light and heat in use. It may be adapted to ordinary gas fixtures, and is so manageable that it is not considered necessary to specify any particular forms of apparatus for generating, holding, or conducting the gas. The burners most approved of are of the argand fashion, and so constructed as to allow the escaping gas an abundant supply of air; the atmospheric air may be supplied, and caused to pass through the vessel containing the mixture, by many well-known mechanical means and contrivances.

And having now described the nature of the said invention, and in what manner the same is to be performed, the patentee declares that he claims—

1. The mixing of water or aqueous fluids with pure hydro-carbons, which are either volatile themselves, or rendered volatile by solution in aldehyde, wood spirit, ethers, or alcohols, or their equivalents, so as to form mixtures capable of hydrating atmospheric air passed through them, and rendering it suitable for producing light and heat, as hereinbefore described.

2. The production, by the means hereinbefore described, of a permanent gas, capable of being collected and retained in reservoirs, and of being conducted in pipes and tubes, and burned at ordinary or even at low temperatures, without the application of artificial heat or any other means to sustain the temperature.

J. P. M. Floret, of 16, Castle-street, Holborn, for "*An improved method of producing simultaneously gas light and lime or plaster.*" Patent dated Dec. 14, 1852.

The object of this patentee is to burn lime or mortar, and produce gas at the same time. He constructs an oven or kiln in the shape of two truncated cones joined at their bases. A vault is made in the centre of the oven at the height of the greatest transverse diameter, in which vault the retorts are placed. The claims are—

1. The application of the herein-described kiln to the simultaneous production of lime, or mortar, and gas.

2. The application of the heat produced by the baking of lime and mortar to the distillation of coal, so as to obtain gas fit for lighting purposes and for burning.*

George Michiels, 57A, Holywell-street, Westminster, for "*Improvements in the manufacture and purification of gas.*" Patent dated Dec. 16, 1852.

The object which the patentee has in view is to produce intense heat by burning coke, &c., with the assistance of oxygen, and to apply this heat to the decomposition of steam.

The oxygen to be used in this process is to be produced by extracting it from the atmosphere, according to the now well known chemical fact that the oxide of barium "at one temperature will absorb oxygen, allowing the nitrogen to pass untouched, and, at another, will evolve oxygen," which he proposes to collect; but to this process of obtaining oxygen the patentee lays no claim.

The oxygen is to be induced to pass through a layer of ignited carboniferous matter placed in a gas generator, which is constructed similarly to a founder's furnace, only with these peculiar features, that the top is to be shut in such a manner that it is only to be opened when the gas generator has to be charged; that the bottom of the charge is in communication with the source of the oxygen, and the upper part of it with an exhauster; by these dispositions the oxygen is drawn through the layer of ignited carbon, and during this passage can be kept in the apparatus under a pressure of at least 12 inches on the water-gauge.

If the layer of carboniferous matter is thin, carbonic acid gas will be formed; and when this is the case the injection of steam for the production of hydrogen must be intermittent with the action of the exhauster; in which case the hydrogen and oxide of carbon must have a special outlet, in order that they may be collected in an appro-

* This patentee does not seem to be aware of the experiments tried by Sir William Congreve, upwards of thirty years ago at the City of London Gas Works, with a similar object.

priate gasholder. In this particular case the oxygen must pass through the layer of carbon without any pressure. If the layer is thick—say one yard—the oxygen is maintained under a high pressure, such as that before mentioned; no carbonic acid gas will be formed by the oxygen, but only oxide of carbon; and in this manner of applying the process the injection of steam can be continuous up to the amount of the disposable heat for its decomposition. Of these two modes of proceeding, preference must be given to the first one when the gas is to be applied to any purpose in which it would be objectionable to have a large proportion of oxide of carbon mixed with the hydrogen; and to the second one when such an objection does not exist.

The heat carried off by the gaseous products, on leaving the gas generator, is to be applied to the production of steam for the injection, the heating of the oxygen on its way to the gas generator, and also for driving the exhauster; the products of the gas generator are to be called "fire gas," and are to be used as fuel. The specification is accompanied by drawings, and describes suitable arrangements for regulating the charge, detaching and breaking the clinkers, keeping the whole mass loose, and carrying away the cinders without interrupting the working of the generator.

The improvement in the purification has for object the rendering lime a useful agent, not only for purifying gas from carbonic acid gas and sulphuretted hydrogen, as it does at present in dry-lime purifiers, but also for separating the ammonia from the gas. To this effect the patentee proposes to inject pure oxygen into the current of gas coming from the retorts at the entrance of the purifiers. The quantity of oxygen being more than what is wanted for transforming the whole of the sulphur of the coal into hyposulphurous acid, the result is that, when the foul gas passes through the lime purifiers, the sulphuret of calcium, which would have been formed there in the ordinary process of purification, becomes hyposulphite of lime under the influence of the oxygen, and this hyposulphite of lime is subsequently converted by the ammonia of the foul gas into hyposulphite of ammonia; and, considering that in the treatment of ordinary gas coals the number of equivalents of hyposulphurous acid to be obtained exceeds the number of equivalents of ammonia, the patentee asserts that the quantity of hyposulphite of lime formed will be more than sufficient to absorb all the ammonia from the gas, and that the refuse lime will, by this process, become a valuable manure.

The patentee considers the process above described to be the most efficient mode of purifying gas by lime, and of giving value to the lime by charging it with hyposulphite of ammonia; but when he has no oxygen at command, he operates in the following manner to obtain the same result:—

Having a set of dry-lime purifiers at work, and one of them having become foul, he puts this one out of action, takes the lid off, and sucks through the layers of the foul lime a large quantity of air, by the assistance of a steam-power exhauster: the quantity of air recommended to be used is not less than forty cubic feet per hour for each square foot of shelf. After this operation has lasted about five hours, he removes half the charge of the shelves, and replaces this half of the foul lime by fresh lime, so that then the purifier contains the half new charge of lime on one side of an ideal vertical plane passing through the middle of the purifier, and on the other side the foul lime which has undergone the process of mechanical ventilation.

This being done, he puts the lid on, shuts the abducting passages to the exhauster, and brings the purifier again into action; when the foul gas passes through it, the ammonia will be detained in the state of hyposulphite of ammonia in the ventilated foul lime by chemical decomposition, already explained when speaking of pure oxygen, and the carbonic acid and sulphuretted hydrogen partly by the lime set at liberty in the ventilated foul lime, and partly by the fresh lime. If all the boxes of a set of four purifiers are similarly worked, the result will be that the process of purification by lime will be complete, and that the foul lime, after having been twice at work in two successive rotations of the purifiers, will contain all, or nearly all, the ammonia in the state of hyposulphite of ammonia.

Frank Clark Hills, of Deptford, manufacturing chemist, for "*Improvements in purifying gas.*" Patent dated Dec. 22, 1852.

The fresh improvement consists in the employment of certain purifying materials mixed or combined with lime, or limestone, or magnesian limestone, for the purpose of dividing their particles so as to present a greater surface to the gas. The lime is to be slacked with sulphuric or muriatic acid in such quantities and strength as to reduce it to a damp powder. The patentee prefers to have a considerable quantity of free lime, so as to absorb the sulphuretted hydrogen and carbonic acid. The use of the acid is to take the ammonia out of the gas, and convert the lime into a valuable manure.

The second part of the invention is for the use of lime slacked with solutions of the sulphate, or per-sulphate, or bisulphate, or the muriate of iron, or the sulphates or muriates of manganese, or lime, or sulphate of alumina, so as to make a powder through which the gas will easily pass; or the lime may be slacked with water, and the solutions (preferably in a concentrated state) may be added to the lime; or the lime may be slacked with water and the sulphates or muriates of iron, or manganese, or lime in a crystalline or solid form (or preferably ground or otherwise comminuted), may be mixed with the lime. Instead of using lime mixed with the sulphates or muriates, it may be slacked with water, and mixed with oxides of iron in a state of minute division. The ammonia of the gas may in this case be taken up in any way that may be preferred. The lime acts in all these cases as a separator to divide or absorb the purifying materials. The solutions do not take up much ammonia till the lime becomes a carbonate or a sulphate; it is best, therefore, to employ a succession of purifiers.

The third part of the invention relates to the mixture of the above solutions or salts with the spent lime from dry-lime purifiers. The claims are—

1. Using lime or magnesian lime slacked with sulphuric or muriatic acids, to bring the lime to a powder.

2. Using lime slacked with solutions or mixtures of either of the sulphates, or per-sulphates, or bisulphates, or muriate of iron, or sulphates or muriates of manganese, or lime, or the sulphate of alumina.

3. Using lime slacked or partially slacked with water, and mixed with any of the said sulphates or muriates, or any combination of them, in a crystalline or solid form, for the purpose of separating their particles, and exposing their surfaces to the gas.

4. Using slacked lime mixed with suitable oxides of iron as are effective for purifying gas, the lime being chiefly for the purpose of dividing and exposing the said oxides to to the gas.

5. Using spent lime with the aforesaid salts or their solutions, for the purpose of purifying gas, as hereinbefore described.

George Bower, of St. Neots, ironfounder, for "*Improvements in the manufacture of gas for illumination.*" Patent dated Dec. 24, 1852.

The object of this invention is stated to be a system of making gas by a simplified process, combining economy of time in the manufacture and increase in the quantity produced consequent upon the charges being "worked off" quickly. The bottom of the retort in which the coal is placed is cast with projecting longitudinal triangular ridges or surfaces, so that the coal to be distilled is exposed to an enlarged heated area, and is stated to be therefore more rapidly carbonised than in a retort of the ordinary kind, whilst the production is increased. An arrangement of a small apparatus is described, in which the hydraulic main, condenser, washer or scrubber, and purifier, are all combined in one vessel, by which great compactness and simplicity are obtained. The patentee does not confine or restrict himself to the precise details he describes, as many variations may be made therefrom without deviating from the main features of his invention; but what he claims is—

1. The general arrangement and construction of apparatus or means for the manufacture of gas as above described.

2. The application and use of retorts with ridged, angular, or undulating bottoms, for the purposes above described.

3. The system or mode of arranging and constructing gas apparatus, wherein the hydraulic main, condenser, washer or scrubber, and purifier, are all combined in one apparatus.

Samuel Clegg, of Regent-square, Middlesex, for "*Improvements in apparatus for measuring gas.*" Patent dated Dec. 28, 1852.

The objects of Mr. Clegg's improved apparatus are, first, to measure gas by passing it at a uniform pressure through an opening whose area is adjusted according to the quantity of gas drawn from the meter by the burners; and, second, to regulate the heights of the gas flames at the burners, or to maintain them at a certain height, irrespective of the number in use.

The gas entering the meter from the street mains is conveyed into a governor, of the construction patented by Mr. Clegg in 1815, floating in water, which, rising or falling with the varying pressure of the gas, decreases or increases the area of the opening admitting it, and thus reduces the gas to one uniform density, permitting it to flow onwards at an unvarying pressure. The governing-hood is adjusted so as to be of equal weight at all points of immersion, and is covered by a vessel connected with the external atmosphere. The gas now passes through a measuring-opening, over which works a slide-valve, which is actuated so as to increase or diminish the area of the opening by means of a second governor of similar construction, into the hood of which the gas is discharged from the measuring-opening before mentioned. This vessel rises and falls in accordance with the quantity of gas drawn from it to the burners, and its motion is caused to work the slide over the measuring-opening. If no burners are lighted, the gas entering the hood will fill it, and cause it to rise to the full extent of its motion, and close the slide; but when one burner is lighted, a portion of the internal pressure will be removed, and the hood will fall to a certain extent, and open the valve in proportion; and when all the burners are lighted, the hood will fall to its fullest extent, and open the valve wide; and the amount of motion of the hood and valve will always be in proportion to the number of burners lighted. The area of valve-opening being adjusted by previous experiment to the total quantity of gas the meter is intended to register, will thus become an accurate measure for all lesser quantities; because the pressure is always uniform, and the area of the opening in exact proportion to the quantity of gas discharged through it.

The motion of the valve is communicated to the train of wheelwork forming the index of the meter by means of an arrangement of levers, governed in their action by clockwork working a ratchet-wheel in connection with the wheelwork of the index; the parts being arranged so as to impel the ratchet at a rate varying with the amount of gas passing through the apparatus. When the spring of the clock-movement is down, the gas is shut off from the burners by the first wheel of the clock lifting a valve, which is so contrived that on the lifting-wheel ceasing to revolve, it shall fall and shut off the gas.

Claim.—The adaptation of the common governer, patented by Mr. Clegg in 1815, to the purposes of a gas-meter; the construction of the valve, which admits the gas from the governor to the outer vessel; and the modes of regulating the motion of the wheelwork, and shutting off the gas when the spring is down.

John Whichcord, the younger, architect, and Samuel Egan Rosser, of 96, Great Russell-street, Bloomsbury, civil engineer, for "*Certain improvements in the mode of burning and applying gas for light and heat.*" Patent dated Dec. 29, 1852.

The improvements relate—

1. To the mode of burning and applying gas for lighting. This is effected by the introduction, in a convenient and suitable position above the gas-burner, of a ventilating bell and tube, made with a trough or channel to receive the condensation of any aqueous vapours arising from the combustion of the gases: the said trough or channel being so placed that the aqueous products can be carried away by a pipe or other known means, or so placed with regard to the flame of

the burner that the said aqueous products shall become evaporated and driven off through the chimney or ventilating tube when the gas is burning.

2. To the arrangement of the globes, glasses, and chimneys of gas-burners, with ventilating bells, whereby a current of cold air is introduced between the outer surface of the ventilating bell or glass and the interior of the globe which encloses the gas-burner, and which arrangement will also ensure the passage of a current of air between the external surface of the gas chimney and the inner surface of the ventilating glass or bell. These objects are effected by causing the pendent glass or bell over the burner to dip below the mouth of the surrounding globe, and, at the same time, to descend externally below the upper orifice of the chimney of the gas-burner. By this arrangement the atmospheric air, which can only enter at the top of the globe, descends between the inner surface of the globe and the outer surface of the bell, then passes up between the outer surface of the chimney and the inner surface of the pendent bell, carrying with it the whole of the products of combustion of the gas up the ventilating tube.

3. For the mode of burning and applying gas for heat. This is effected by placing the gas-burner of a stove within or under a tube or casing for conveying the heat through a chamber surrounded with water or other fluid. This tube or casing is made with a trough or channel placed in a suitable position for conveying the condensed aqueous vapour that may be formed inside the chamber by the combustion of the gases, and so placed that the aqueous products can be conveyed away by a pipe or other known means, or so fixed with regard to the flame of the burner that the said aqueous products shall become again evaporated and carried up through the chimney; or the said tube or casing may be made similar to the worm of a still or refrigerator, and the end turned down to allow the condensation of the products of combustion to fall into a saucer or vessel made to catch or receive the same.

E. Clarence Shepherd, of Duke-street, Westminster, civil engineer, for "*Improvements in the manufacture of gas.*" Patent dated Jan. 4, 1853. (A communication.)

This invention is for a mode or modes of producing certain gases by the action of currents of electricity upon water, having chemical matters dissolved in or mixed with it, and then combining or mixing the gas or gases with a gaseous hydro-carbon, and either with or without a portion of atmospheric air, for the purpose of enabling the mixed or combined gases, when burnt, to produce a larger quantity of light and heat. The machines the patentee prefers for decomposing the water are those patented by him Oct. 24, 1850, and July 2, 1852. Several combinations and mixtures of chemical matters may be used for this purpose; one of them consists in combining a mixture of a mineral acid, such as sulphuric, with an organic or vegetable acid, such as oxalic, in such proportions that the acids and water shall be in relation to the intensity of the decomposing current. One-twentieth part of sulphuric or other mineral acid, and nineteen-twentieths of oxalic or other vegetable organic acid, is indicated as a suitable mixture. The oxalic acid must be pure, and dissolved in water, so that the liquid shall be saturated at a temperature of 15° of Centigrade before the sulphuric acid is added. The gases produced by the electrical current are afterwards to be mixed or combined with any hydro-carbon. The patentee uses the essence of resin for this purpose, at the temperature of ebullition, absorbed into metallic sponges. These sponges are prepared by soaking pieces of coke in a solution of nickle or cobalt heated in covered crucibles. The sponges saturated with the essence of resin are put into a vessel and heated so as to convert the latter into gaseous hydro-carbons, which are mixed with the gases generated from the water and chemical matters. The claims are—

1. The addition of a vegetable organic acid with a mineral acid to water in the apparatus for decomposition, for the purpose of producing a gas or mixture of gases, as hereinbefore described.

2. The use of metallic sponges in the process of converting the essence of resin into a hydro-carbon gas, as hereinbefore described.

3. The combining or mixing the gases produced by the action of currents of electricity upon water and the gaseous hydro-carbons obtained, as before described, together with or without a portion of atmospheric air, for the purpose of heating and lighting, as hereinbefore described.

George Mair, 41, Upper Bedford-place, Russell-square, London. "*The patent Multiple Gas Stove.*" Registered Feb. 19, 1853.

Fig. 1.

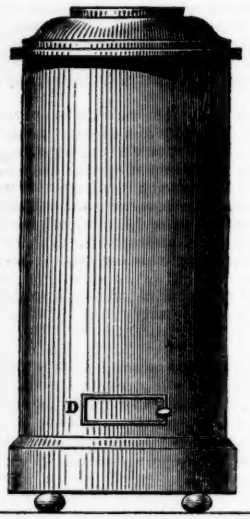

Fig. 3.

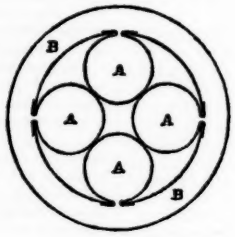

Fig. 2.

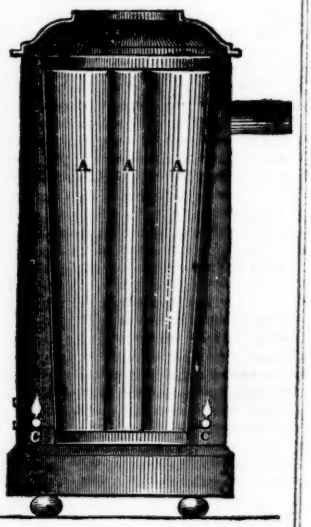

Fig. 1, is an external elevation of the stove.

Fig. 2, a section; and fig. 3, a plan, showing tubes,

A, A, A, A, open at top and bottom.

B, Chamber from which the tubes, A, receive heat.

C, Gas-burner.

D, Transparent door for lighting the gas.

Parliamentary Intelligence.

BRISTOL GAS AND BRISTOL AND CLIFTON GAS COMPANIES' AMALGAMATION BILL.

Lords' Committee.—Wednesday, June 16, 1853.

This bill, on being brought from the House of Commons to the House of Lords, was referred to a committee of the latter House, and opposed by the Corporation of Bristol.

The Earl of Eglinton acted as chairman of the committee.

Mr. Sergeant Wrangham, Mr. Beckett Denison, and Mr. Lucas, appeared in support of the bill; and the Corporation of Bristol was represented by Mr. Slade, Q.C., and Mr. Skinner.

Mr. B. Denison, in opening the case in behalf of the promoters of the bill, stated that there was no substantial opposition to it, but merely certain objections as to its details. The object of the bill was the amalgamation of the Bristol Gas Company and the Bristol and Clifton Gas Company, which had for many years past lighted the town of Bristol and its suburbs. The first of these companies in date and magnitude was the Bristol Gas Company, which was established in 1815, with a capital of £50,000, which was subsequently increased in 1821 to £100,000, which was the present amount of their share capital. The company had contracted with the local authorities of Bristol to light the public lamps for 21 years at £5 a lamp. This contract expired in 1842, and was renewed at £4. 4s. a lamp, which included about 17s. for the expense of lighting and cleaning the lamps, leaving a sum of about £3. 7s. applicable to gas only, or at the rate of 2s. 9¼d. per 1000 cubic feet. The number of public lamps lighted by this company was 2346, some of which were in a part of the town where there was very little private consumption of gas, and where it was, consequently, very unprofitable for the company to lay their mains. The Bristol Gas Company had, from its institution, paid dividends to its shareholders varying from 6 per cent. to 10 per cent. (its present rate), or an average of 8 per cent. per annum. They had sunk nearly £32,000 of their profits in the improvement of their works, &c.; but for the purposes of this bill they had consented to reduce that amount to £25,000, for the convenience of amalgamation between the two companies. The other company—the Bristol and Clifton Gas Company—was instituted in the year 1823, with a capital of £30,000, for supplying the district of Bristol and Clifton with oil gas, there being a provision in their act preventing them from making any coal gas whatever. The project, however, turned out a failure; the price of oil rose considerably, and consequently, from 1823 to 1836, the company obtained no profits at all. In 1836, thinking that the experiment of making oil gas had been tried long enough, they obtained powers to make coal gas, for which purpose they increased their capital to £40,000; and in 1847, their business having increased to a considerable extent, they raised the amount of their capital to £80,000, with a borrowing power of £26,000 more. The company had not, however, raised the whole of that sum. Their present share capital amounted to £65,000, and they had bonds to the amount of nearly £14,000. They had contracted to light the public lamps in the district of Clifton at £4. 18s. per lamp, which (deducting the expense of lighting and cleaning) was at the rate of £3. 15s. for the gas, or about 3s. 2d. per 1000 cubic feet. In neither case did the companies derive any profit whatever from these contracts; and in the case of the Bristol and Clifton Company, the contractors not only defrayed the expense of lighting and cleaning, but they also supplied the iron columns, which accounted for the difference between the charges of the two companies. The number of public lamps lighted by the

Clifton Company was 566, as compared with 2346 lighted by the other company. The Clifton Company had 35 miles of mains, and the older company had upwards of 70 miles. The two companies had not been exactly in competition with each other, because they were instituted for the purpose of serving different districts. There were, however, 16 miles of duplicate mains, which occasioned not only considerable annoyance to the public, but great expense to both companies, in double leakage, and the duplication of mains where one would serve if the companies were amalgamated. Another public advantage which would accrue from the amalgamation would be this—that in case any accident happened to the gasometer, there would be no interruption of the supply, inasmuch as a communication could be opened with the other works. This was not an accident that was liable to occur frequently; but when it did occur, the inconvenience, in the absence of such an arrangement, would be most serious and considerable. The two companies had, from time to time, since their establishment, made continual reductions, according to their ability, in the price of their gas. In 1820 the Bristol Company charged 15s. per 1000 cubic feet, but they had gone on extensively reducing their charges, until they had arrived at the present low rate of 4s. 6d. for ordinary supply. The price charged by the Clifton Company in 1836 was 12s. 6d.; its present charge was uniform with that of the other company, which was lower than the price charged for gas in any of the neighbouring towns. No complaint whatever had been made by the inhabitants either as to the price or the quality of the gas supplied to them by each company. The bill proposed also to give powers to the amalgamating companies to increase their areas of lighting to accommodate the project which had been formed of making additional docks in the town, and also with a view of supplying certain parishes in the suburbs. Additional capital was required to carry out this extension of their works; but this would not be, however, as in the case of a railway company, a benefit conferred on the shareholders, but it was proposed that the additional shares so created should be put up to auction, that any of the townsmen who might be desirous, might buy into the company. The additional capital for which they asked was £90,000, which included, however, the balance which the Clifton Company had not yet raised. The actual amount of additional capital would be, therefore, only £46,000; and the principle on which they came to Parliament for powers to raise this sum was that of increasing their capital according to the extension of the area of their proposed operations, thus avoiding the expense of frequent applications to Parliament. The opposition to the bill emanated from the Corporation of Bristol, as the local board of health; and the petition which they had presented alleged in general terms that the preamble of the bill was untrue. From the manner, however, in which the corporation was met in the committee of the House of Commons, he did not apprehend that the petitioners would enter into that objection at all. They complained, however, of the proposal to extend the company's operations to certain places in the environs of Bristol. This objection was fully entertained by the committee of the House of Commons, which was assisted by both the members for the city; and the committee decided that the company should be limited to Westbury-upon-Trym, Horfield, Stapleton, and St. George's, in Gloucestershire; Bedminster, St. George's, Portbury, Portishead, Brislington, and Keynsham, in Somersetshire. The objection of the local board of health was simply this—that the companies sought to extend their works to unprofitable districts, which would delay the period when they would attain their excess of 10 per cent., which surplus would be applied, according to the act, to the improvement of the city of Bristol. The petitioners also asked their lordships to fix a *maximum* price for the gas—an application which had not been supported by any ground, and which was unnecessary when the committee referred to the very reasonable deductions which the two companies had voluntarily made. The general act of 1847, applying to gas companies, fixed the *maximum* of dividends, but did not make any such limitation with regard to price, except with the consent of the company. When there were competing companies, such limitation would be made at the request of the company in order to court the support of the consumers. Again, the petitioners called upon their lordships to compel the promoters to supply gas to the public lamps equal to twelve sperm candles, according to a certain test, which was to be conducted by an inspector appointed by the corporation, and paid by the companies. Now, apart from the consideration of the admitted uncertainty of this test, and the impossibility of always maintaining, without some short interruption, a uniform standard, he (Mr. Denison) must confess that this proposal of having an inspector, who was to receive his salary from the company, while he was appointed by another body, looked very like a corporation job.

Mr. Slade, Q.C.: It is not so. We are to have the appointment conjointly with you; and if we do not agree, then the matter is to be referred to the recorder.

Mr. Denison: Well, the recorder was appointed by the corporation, and they could guess pretty well which way his decision would go. They objected, however, to such arbitrary inspection on principle. The candle test was very uncertain, and at any rate, if adopted as a test of the quality of the company's gas, should be conducted by a disinterested person, and not by one appointed by the corporation.

Mr. Denison then called and examined Mr. *H. H. Townsend*, who gave evidence to the following effect:—I am secretary of the Bristol and Clifton Company. That company was established in 1823 as an oil-gas company. It did not answer, however, so that in 1836 it was turned into a coal-gas company. It was then authorised to raise a capital of £40,000. In 1847 we got another act to increase the capital to £80,000, with a borrowing power of £26,000. We have not raised the whole of our capital by something like £40,000. Our present capital stands at £65,000. We light part of the municipal city of Bristol. We have a contract for supplying and lighting the public lamps at £4. 18s. per lamp per annum, including 6s. for the rental for the use of the lamp, and £4. 12s. for the gas. In Westbury the price is £4. 4s. per lamp, but the company do not, in that case, find the lamp columns. In both cases, however, the company paints the columns, and keeps them in repair. Their charge for the public lamps is at the rate of 3s. 2d. per 1000 cubic feet. That contract expires in October next. We light 628 public lamps altogether. We have 35 miles of mains, of which about 16 miles are duplicate of the other company. We did not make any profit whatever for the first eleven years. The profits after that—when we became a coal-gas company—have been increasing, and now we have got up to 6 per cent., which is the highest they have ever been. As we come under the general act of 1847, we are subject to the usual limitation of our profit to 10 per cent. We have expended altogether about £80,000. The arrangements for this amalgamation between us and the other company were made by award. Our capital was put at £54,800, although we actually spent £80,000. We gave up the difference with the view of arranging between the difference of our 6 per cent. and their 8 per cent., so that the shares might work out equally. Last year the local board applied to us to extend our public lamps, and we then contemplated lighting them jointly with the other company. We laid our heads together, however, and came to the conclusion that it was better not to accept the offer of the local board, because it involved a necessary duplication of a vast extent of mains. Thereupon an arrangement was made for settling an amalgamation by arbitration. The price charged for gas by our company is now 4s. 6d., and it has been always, since 1836, the same as the price charged by the other company. There has been no competition between us as regards price—no competition whatever in that sense.

Then in what sense?—The only sense, I think, would be fighting for a customer now and then.

Well, in that fighting for a customer now and then, does the breaking up of the street frequently take place?—Undoubtedly.

You are obliged to change the service-pipe, so that the breaking up of the street is absolutely necessary?—Yes, and not only that, but the disused service-pipe of the rejected company remains and becomes corroded, and escapes of gas very frequently arise from that circumstance.

That arises from the competition for customers?—Yes.

Leakage, I suppose, takes place from all gas mains? It is impossible to prevent it?—I never heard of any way of preventing it.

And then, of course, the more mains the more leakage. If there are two companies, there is a double leakage?—Yes.

What do you calculate the leakage amounts to?—I should say about 25 per cent., but we cannot tell exactly. Some portion is stolen, but the greater quantity of it is lost in leakage. Some is also lost in condensation.

But a considerable quantity of the 25 per cent. is lost by leakage?—The greatest proportion.

Is it the case that the parish of Clifton is at a very much higher level than the old city of Bristol?—The highest point is nearly 300 feet above the city.

Then can you tell their lordships what is the difference of pressure which that level would require?—Supposing the actual pressure at the works to be $\frac{7}{10}$ of an inch on a column of water, at the summit it would be two inches, or rather more.

Does it ever happen that the source of the supply of gas is stopped altogether for a short time, from repairs and so on?—It is of very rare occurrence.

Has there been any complaint against your company as to the quality or price of its gas?—No, never.

Cross-examined by Mr. Slade, Q.C.

Am I correctly informed that you yourself use a test?—I do.

Do you find any difficulty in it?—I find that the various officers of the company who apply the test arrive at different results.

But do you yourself find the results variable? Do you keep a book?—I do not myself.

Does any officer of your company keep a book in which the results of the tests are recorded?—Not regularly, but from time to time; I cannot produce you a regular entry.

But could you produce us a book where entries are made of these tests from time to time?—I have such a book.

For the purpose of ascertaining the quality of the gas you are supplying?—Just so.

How long have you been in the habit of keeping such a book?—For several years.

Will you tell the committee, then, what is the quality of the gas you have supplied, taking it with reference to the power and brilliancy of so many spermaceti candles?—Our usual standard is from 12 to 13 spermaceti candles.

You find, then, that the usual standard of the gas you supply to the public is from 12 to 13 candles?—That is the standard at which we aim, and at which we usually arrive.

And you are not satisfied unless you do arrive at that standard?—We think that the consumers are entitled to gas of that quality.

Now, there is very little difficulty, I suppose, to a man practically acquainted with it, in ascertaining whether gas is of that quality?—There is some.

But you can ascertain the quality with the candles, and the result of your experiments, you say, is, that the light you produce is equal to 12 or 13 spermaceti candles, and these results have been entered from time to time in a book for your own satisfaction?—Yes, for our own satisfaction.

And also, I suppose, for the satisfaction of any complaining customer?—I am not aware that we ever had any complaining customers.

Now, you say—and I am partly adopting a question put to you—that you had no competition with the other company in a particular sense. In what sense do you mean there was no competition?—As to price.

Is your price the same as theirs?—Yes.

4s. 6d. per 1000 cubic feet?—Yes.

But not the same as regards the public lamps?—No.

But precisely the same as regards private lights?—Yes.

Now, with regard to customers. Each party, of course, was very anxious to get hold of any customers they could, so that, as regards customers, there was a competition?—There was.

Competing even as to customers would, however, be put an end to now by this bill?—Certainly.

You will have it all your own way?—Of course; as there will be only one company, the consumers must come to that company.

You put no limit on your price?—No.

So that the consumer is quite at your mercy?—To an extent, certainly, he is.

And also the public lights of Bristol?—No; we have contracts for them.

But then those contracts will very soon expire. How long has the longest to run?—Eighteen months; but we have a clause in this bill compelling us to supply the public lights at the lowest price charged to the private consumer.

Just so; but that, I think, only applies to places within 25 yards of your mains?—Yes.

Now, it was not always so that your two companies supplied at the same price?—Not originally, because we started with supplying oil gas.

But when you became a coal-gas company, you did not agree in price?—The price of both companies has been identical throughout.

Then you have been, as far as price, quite amicable?—We have.

But was not this the process—when one reduced, then the other reduced?—I cannot remember the first reduction, but I can say, as to the late reductions, that the price has been diminished by arrangement between the two companies.

Well, then, just tell us how many reductions have been made. The other company began at 15s. what did you commence at?—We began at 10s. I was not the secretary of the company at that time, and may not be quite accurate, but I believe it was 10s. that we commenced with.

Then who made the next reduction?—I do not know.

Oh, but I suppose the process was this. Each company kept making reductions, until at last you came to the lowest; and that was the result of competition?—It was the result of the competition I have stated—namely, that with regard to customers.

Now, do you think that, if there had been no competition, that would have been the result?—I think it would. The price would have been gradually reduced—not perhaps at the same rate—but it would have been reduced from time to time, until it had reached the lowest figure at which each company could afford to supply their gas.

But you tell us that your company did not reduce, at any rate, until there had been a reduction below you by the other company. Were you each awaiting, then, until you saw how low the other would go?—No; I do not believe that that was the case, but that the reductions were occasioned by a desire to increase the number of customers, and to increase the general consumption of gas, which we could only expect to do by decreasing the price.

You say that the Board of Health required an extension last year. The Board of Health had no power to compel you to light any of the public lamps?—I am not aware that they had any power to compel us.

It was entirely optional with you whether you lighted or not?—They had no other means of lighting the city, but it would be a very impolitic and unprofitable thing for the company to allow any other mode of lighting the public lamps.

But I understood you to say that lighting the public lamps is a loss to the company?—Well, it is no gain. We are working at a loss, because we get no interest for the capital we have invested.

It is a positive loss?—It is.

Now, do you not think that if it were proposed to give you the lighting of the public lamps at 4s., instead of 2s. 9d., that would be rather a gain to you?—That would unquestionably be a profit.

You would be satisfied, would not you?—We would be much better satisfied, I should say.

You would have no reason to complain?—I think not.

And that would apply not only to your own company, but also to the other company?—I am not in a position to speak as to the feeling of the other company on the matter.

But you should imagine that it would be very satisfactory?—Yes, I think so.

Do you know that the Corporation of Bristol pay as much as £10,000 a year for their public lamps?—I do not know the sum, as the money is not paid through my hands.

What sum do they pay you?—Something like £2000 a year.

For 600 lamps?—Yes.

Well, as the other company supplies upwards of 2000 public lamps, it would not surprise you if £10,000 a year were paid from the public funds for these lamps?—No, it would not. Indeed, I think the sum would be somewhere about that amount.

I suppose at present you do not supply Portishead, or any of those outlying parishes in which these docks are to be?—No.

There are no docks there yet?—No.

There is no act for any dock either?—I am not aware whether there is an act. There is a proposal for constructing docks there.

The Earl of Eglinton: There is no bill in Parliament?

Mr. Slade: No, my lord. How far is Portishead from Bristol?—I think about eight miles.

Is it at present a ship wharf?—No, it would be called a watering-place.

Are there many inhabitants there?—I cannot say. There are a great number of houses there. It is a sort of summer retreat. There might be a thousand inhabitants in the place.

Now, where does Portbury lie?—Somewhere between Bristol and Portsishead.

Would there be about 500 inhabitants there?—I have not noticed the census, but there would be about that number, I should say.

Have you proposed by your bill to take power to light Portishead and Portbury?—Yes, there is a provision, but it is not compulsory on us.

Oh, you take very good care of that! Now, have you any power to break up the road between Bristol and Portbury?—At present we have not.

There are intervening parishes through which you would have to pass? Is that so?—Yes, I think it is so.

You have no power to pass through Long Ashton or Abbot's Leigh?—No, we have not, unless we get it now.

Unless you get them now! I mean that you had no such powers proposed in your bill?—I do not remember.

What! don't you remember that, very much to your dismay and chagrin, the clauses giving you power to break up those places were thrown out in the Commons' committee?—I apprehend that the power given to us of lighting those places with gas would impliedly give us power to break up the streets.

Well, then, how do you, as secretary, propose to get out of this difficulty? Do you intend to have additional works at Portbury?—I suppose that the plan would be to have small works there, and not to carry the mains throughout.

You intend to do that, and to mulct the inhabitants of Bristol of the money they would become entitled to, on your having an excess of dividend over ten per cent?—I do not look on it in that view, because I think that the amalgamated companies would be in a better position to light those small places with gas than any independent company which might be formed there.

Do you think that there are any other places within the circuit of eight miles where you would like to have the same privileges?—There are several other villages in which the buildings are rapidly extending, and they will probably be requiring gas at no very distant day.

And you want power to light those villages?—Yes, we think that we are the proper parties to supply them.

And the Corporation of Bristol does not object to that?—No, I believe not; but they do to some places.

I suppose, ju 'ging from your answer, that you never contemplated driving a main so far as eight miles to light Portishead from your central gas works at Bristol?—I do not think that a definite plan of lighting Portishead was ever contemplated.

As Portishead and Portbury exist at present, you should propose to have gas works there?—Yes; and they would pay accordingly.

Oh, I suppose, then, there being no competition there, you would put it on high—about 10s., I suppose?—I can conceive a case where the inhabitants would be very glad to pay an additional rate for the advantage; but it does not follow, therefore, that that would be an exhorbitant rate.

Re-examined by Mr. B. Denison.

There is no complaint as to the existing price?—No, sir.

You use the test yourself?—I do, sir.

With all your exertions to keep up the gas to the standard of 12 or 13 candles, do you find it sometimes impossible to do so?—We do.

Then, what do you think would be the result of this test, were it in the hands of an arbitrary inspector, and the gas were to drop down for a day or two?—I think it would create great and groundless dissatisfaction with the public, though the falling off might be only temporary and very slight.

And would lead to litigation?—Probably.

But, taking their own test of argand burners, do you find it possible to obtain always the same the result?—No; sometimes we differ two candles, and such mistakes are possible even in the most careful experiments.

Now, the 32nd clause, proposed by the corporation to secure for the public lamps a certain rate of charge, has been assented to by both companies, has it not?—It has.

Now, I understood from my learned friend's question, that they now propose to vary that, and they ask to have the public lamps supplied at 4s. per 1000 cubic feet. Well, we have no objection to that, I think?—I should think not.

In fact, the corporation does not seem to like the bargain it made in the House of Commons?—It seems not.

Now, as to Portishead and Portbury, my learned friend had his finger on a place in that road called St. George's, but speedily withdrew it. That is a small place, I think?—It is.

Well, what population?—I really cannot tell. Perhaps a few hundreds.

Is that on the road to Portishead—to the intended docks?—Yes.

A word about these docks. I believe they have got so far as to have parliamentary notices served, and deposits, though they have not yet introduced their bill?—I am not aware that there is any bill at present.

Well, do these places that have been mentioned form a pretty continuous road?—Not at present, I think.

When your company originally started to supply Clifton and Bristol with oil gas, was Clifton then continuous with Bristol?—It was not.

In 1849 there was a gap between Bristol and Clifton which is now filled up?—In my recollection there was more than a mile or a mile and a half which is now filled up.

Now, you say that, in all probability, these places would be supplied by small works of their own?—Probably so.

I suppose, however, that in that supply you do not expect to get the same profit as from that in the city of Bristol. You do not expect such a profit as would induce an independent company, having nothing to fall back upon, to supply these places alone?—Certainly not.

Then, unless you supply them, these places are all likely to remain without any means of using gas for some years to come?—Yes, until the population increases.

Mr. *E. Wait*, secretary of the Bristol Gas Company, was then called and examined. He said: The Bristol Gas Company was established in 1815, with a capital of £50,000, which was subsequently increased to £100,000. We have contracts to supply the public lamps of Bristol

at £4. 4s. a lamp per annum, which includes the lighting and cleaning. That sum is at the rate of about 2s. 9d. for the gas alone, the same as the later contract of the other company. We should be, undoubtedly, perfectly willing to take 4s. for our public lamps instead of 2s. 9d. We light about 2400 of the public lamps, some of these being in unprofitable parts of the city, where we would not otherwise incur the expense of laying down mains. We were under no compulsion to lay down mains in those localities; our first act made us lay mains in streets, lanes, &c., of the city within certain limits. We have, however, in order to supply the public lamps, extended our mains beyond those limits into places where we have little or no private custom at all. Our profits have fluctuated from 6 to 10 per cent.; they have avaraged about 8. We have sunk about £30,000 of our profits in the works. Our capital is, nevertheless, fixed by this award at £25,000. We have not any bond debts. We have lately made contracts with the Board of Health for further extending our works.

Have you any capital for carrying out that extension except what you expect to be empowered to raise by this bill?—That portion of the capital which was to be devoted to that purpose was paid out of our reserved fund.

You are authorised, then, by your original act, to maintain a reserved fund of £10,000?—Yes.

And you have reduced that in anticipation of the amalgamation?—The extension which we made agreeably to the application of the Board of Health absorbed the £10,000.

So that you require additional capital now for these further extensions?—Yes.

Has any complaint been made as to the quality of your gas?—I never heard any.

The price is 4s. 6d.?—Yes.

You have been secretary to your company longer than Mr. Townsend has been to his?—Yes, I have been secretary to it for 30 years—since its institution.

And the reductions in price which have from time to time been made, have been concurred in by both companies?—Yes.

Cross-examined by Mr. SLADE.

You said that "Yes" in a very hesitating manner. Is it true what Mr. Townsend said, that the process was this—first one company reducing and then the other?—Well, I believe it was simultaneous.

Well, but was not the process as I have described it in some cases?—Well, it might have been in one or two cases.

Was not that the result of competition, then?—Well, when one company reduced, the other was obliged to follow.

That was for the purpose of securing the custom?—For getting new customers.

Spite of the reductions, you are still, however, a flourishing company?—ten per cent. dividend?—Yes.

How long has that ten per cent. been maintained?—For the last year and a half or two years continuously.

I suppose it has never been for many years below eight per cent.?—No, not for the last four or five years.

Now, may I ask you what is the quality of your gas?—I believe it is somewhere about twelve or thirteen candles.

Then there is nothing new in that comparison between the illuminating power of candles and gas?—I do not profess to understand that question, not being an engineer, or having ever personally tried the test.

No, but I ask you, is it at all a new thing to test the quality of gas so?—I am scarcely competent to answer that question.

Well, how long have you known it to be used?—I have known it for several years, but I never myself used it.

Will you inform the committee how you arrive at the fact of the supply to the public lamps being a loss?—We take the charge for coal, labour, and other contingent expenses, ascertain the quantity of gas made in the year, divide the one by the other, which gives us the cost of every 1000 cubic feet we manufacture.

When these tenders were sent in for the extra works you have just mentioned, had there been an arrangement between you and the rival company as to the amount of the tenders?—It led to the negotiation of an arbitration.

But had there not been an arrangement?—Subsequently to the amalgamation, but not previously.

No; but you told us that you sent in tenders. Had you and the rival company arranged what the amount of the tenders should be?—Yes.

I thought so; and I suppose that led you to talk of an amalgamation?—The amalgamation arose out of it.

I believe the tenders were identical to a penny?—I cannot remember. I do not know that there was any difference in the tenders. I rather think that the prices were the same; but it is a long time ago—more than a year and a half ago.

The amalgamation would put an end, I suppose, to what you consider a ruinous competition? You did not contemplate that it would lead to any further reduction in price?—No; I thought it low enough already.

But you must get your ten per cent. from some one? Now, you get £8000 from public lamps; what do you get from private lights?—Our income is about £20,000 altogether.

That is £12,000 from private consumption, and £8000 from the public lamps. The public is all loss, and the private, I suppose, is pretty good gain?—It enables the company to pay ten per cent.

And also to pay the interest on money spent in public lights?—Yes. The interest on the capital invested in public lamps is altogether lost.

What does it cost you to manufacture 1000 cubic feet of gas?—About 2s.

That is the cost?—Yes.

By the Earl of EGLINTON: Are the works so situated that, if the Clifton Company were to fail, you could supply the whole of that area from your works with a profit to yourselves?—No, I do not think we could. It would be necessary to have new works there, and it was contemplated, prior to this amalgamation being mooted, that our company should purchase land in that neighbourhood, and erect works there, in order to meet the increased demand in that locality.

Do you think that the same circumstances apply to the other company?—I do.

Does that arise from elevation?—Yes.

(To be continued.)

Legal Intelligence.

ROLLS COURT, FEB. 4, 1853.

(Before the Right Hon. Sir JOHN ROMILLY.)

THE SHEFFIELD CONSUMERS' GAS COMPANY *v.* HARRISON.

This suit was instituted by the Sheffield Gas Consumers' Company, to compel the defendant, Mr. W. Rooke Harrison (who was one of the original promoters of the company), to execute the company's deed of settlement, so that they might compel him to pay up his calls on the 100 shares allotted to him. Mr. Flintoff, the secretary to the defendant's company, made affidavits setting forth the grounds on which the company sought to compel the defendant to execute the deed. The defendant filed affidavits setting forth the grounds on which he refused to do so; amongst others, that the deed of settlement did not fairly or properly carry into effect the objects for which the company was formed; that the terms of the prospectus were varied and altered in several important particulars; and that it was always held out that the company could be and would be carried on without the expense of an act of Parliament. The defendant further submitted that the alleged agreement which the company sought by this suit to enforce against him was one which the court would not specifically perform; that the plaintiffs ought to be left to such remedy, if any, as at law they might have against him in respect of the agreement; and that, inasmuch as the prospectus was the basis of the deed of settlement, as the deed of settlement was not in accordance with the prospectus, and as the terms or conditions of the prospectus had not been fulfilled, he was not bound and ought not to be compelled to execute the same.

The leading counsel in the case were Mr. Daniel, for the plaintiffs, and Mr. Barber for the defendant. At the close of the plaintiff's case, the Court gave judgment without calling upon Mr. Barber for a reply.

The MASTER of the ROLLS: Mr. Barber, in this case I will not trouble you; but I will not express any opinion at all whether it is a good contract at law or not, or whether an action for damages would lie upon the subject. I am satisfied that this is not a contract which a court of equity can enforce. This is in fact a contract to make a man a partner in a partnership, by which, according to the terms of the partnership, he could cease to be a partner within a very short space of time; and according to the deed, as I am informed, within fourteen days. I entertain no doubt whatever that this court would not enforce specific performance of a contract for a man to become a partner in a partnership which he may dissolve immediately afterwards, so far as he is concerned. This is one of the first principles which every draughtsman is familiar with—that to specifically perform a contract of this description would merely be stultifying the court. It is said that you must not assimilate these companies to ordinary partnerships. It is true that in divers respects they differ from ordinary partnerships, because the Legislature has interfered to give certain liabilities to them which would not attach to them in the ordinary case of a partnership; or, rather, I should say, it has given them means of enforcing equities which by reason of the great number of partners would not enable any one individual partner to enforce, consistently with the rules of practice which attach to cases of partnership in this court; in all other respects they must be treated and considered as partners. It is very true that certain cases have been cited to me to show that this gentleman would be a contributory. Upon that I express no opinion at all. It is obvious that the case of contributories is perfectly distinct from the case which I have now to consider. In the first place, who is to be the contributory, and who is not, depends upon an act of Parliament which specially states who shall be so. It is possible that creditors may have advanced money or supplied goods upon the faith of this person's name, believing him to be a member of the partnership, in respect of which the other shareholders may be sued; and it may be very inequitable that this person, who has allowed his name to be used, should not be compelled to contribute with the other shareholders who may be compelled to pay moneys which, in part at least, have been incurred by reason of his permitting his name to be used. That stands on a totally different equity to that on which this court will compel this man to execute a deed and become a partner in a partnership, who is unwilling to become a partner, and who may put an end to it immediately. The last case which has been cited by Mr. Daniel (Hutchinson *v.* the Surrey Consumers' Gas Company) seems to show that this is no contract or agreement at all—that it could not be executed or enforced in a court of law. I am satisfied that if there is any right it is only that which can be enforced in a court of law. It is to be observed that, although these joint-stock companies have existed now such a vast number of years, and cases of this description must have been occurring over and over again with every joint-stock company, or almost every joint-stock company, I am not now referred, nor do I believe I could be referred, to any case whatever in which such an attempt has ever been made. It is, therefore, a purely speculative claim, and the claim must be dismissed with costs.

Share List.

(Directors and Managers of Gas Works are earnestly requested to enable us to rectify the errors and fill up any omissions in the following List.)

The Companies whose names are printed in italic type are incorporated by Act of Parliament.

Number of Shares issued.	Amount per Share	Name of Company.	Amount paid up per Share	Dividend per Cent. per Ann.	Price.
	£	**ENGLAND.**	£ s. d	£ s. d	£ s. d
		Aberdare			
		Abergele			
		Aberystwith			
		Abingdon			
		Accrington £7000		5 0 0	
		Albrighton			
		Alcester			
		Alford, Lincolnsh.			
		Alfreton			
		Alnwick			
		Alston Moor			
250	10	Alton	10 0 0	5 0 0	10 0 0
800	5	Altrincham	5 0 0	6 0 0	
		Amlwch			
160	10	Ampthill	10 0 0	5 0 0	10 0 0
350	10	Andover	10 0 0	6 0 0	11 0 0
		Appleby			
		Arundel			
		Ashbourn, Derby			
		Ashburton			
		Ashby-de-la-Zouch			
		Ashford, Kent			
1600	25	*Ashton-under-Lyne*	25 0 0	10 0 0	52 0 0
		Atherstone			
		Axminster			
200	20	Aylesbury	20 0 0	5 0 0	21 0 0
		Aylsham, Norfolk			
		Bacup, Lancashire			
		Bakewell			
		Baldock			
140	25	Banbury	25 0 0	10 0 0	50 0 0
		Bangor			
500	5	Barking, Essex	4 10 0	5 11 0	5 0 0
250	10	Barnard Castle	10 0 0	5 10 0	10 15 0
		Barnet			
		Barnsley £6000		7 10 0	
100	20	Barnstaple	20 0 0	5 0 0	23 0 0
		Barton		5 0 0	
120	25	Basingstoke	25 0 0	8 0 0	28 0 0
2400	20	*Bath*	16 0 0	6 0 0	25 to 30
		Battle £2000		6 0 0	
56	26¼	Bawtry	26 10 0	5 0 0	25 0 0
		Beaumaris			
300	30	Bedford	25 0 0	4 0 0	20 0 0
		Bedworth			
		Belford			
		Bedale, Yorkshire			
		Belper			
		Beminster			
		Berkhempstead			
700	5¼	Berwick-on-Tweed	5 10 0	6 8 0	5 15 0
		Beverley			
		Bewdley			
280	10	Bideford	10 0 0	6 0 0	10 10 0
		Biggleswade			
160	10	Bicester	10 0 0	5 0 0	10 0 0
		Bilston £15,100		7 0 0	
		Billericay			
		Bingley £7400		4 0 0	
		Birkenhead £70,000	35 0 0	3 0 0	35 to 37
2400	50	*Birm. & Staffordsh.*	50 0 0	10 0 0	103 to 103
	25	*Ditto*, new shares	7 10 0	10 0 0	13 pm.
938	75	*Birmingham*	75 0 0	10 0 0	155 to 158
		Bishop's Auckland			
140	25	Bishop's Stortford	25 0 0	5 0 0	24 0 0
3000	15	*Blackburn*	15 0 0	10 0 0	
		Blackpool			
		Blandford			
		Blythe			
		Bodmin			
		Bognor			
		Bolton £38,582		9 19 5	
		Boroughbridge			
		Boston £8000		10 0 0	
200	10	Bourn	10 0 0	5 0 0	
		Brackley			
		Bradford, Wilts			
		Bradford, Yorksh. £45,000		9 10 0	
		Brampton, Cumb.			
		Brandon, Suffolk			
		Brecon			
		Bridge-end, Glam.			
		Brierly Hill			
		Brighouse			
2250	20	*Brighton*	20 0 0	5 0 0	15 to 16
1125	20	„ new shares	16 0 0	5 0 0	10 to 12
		Brighton and Hove £50,276		3 10 0	
4250	20	*Bristol*	20 0 0	9 0 0	37 0 0
1725	25	*Bristol and Clifton*	25 0 0	6 0 0	34 0 0
		Brixham			
		Braintree			
750	50	*Brentford*	50 0 0	5 10 0	48 to 50
800	25	„ new shares	11 0 0	5 10 0	11 0 0
		Brentwood			
200	30	*Bridgwater*	30 0 0	5 0 0	30 0 0
400	10	Bridlington	10 0 0	5 0 0	10 0 0
		Bridport			
		Brigg			
		Broadstairs			
100	50	Bromley, Kent	50 0 0	6 0 0	52 10 0
		Bromsgrove			
		Broughton			
120	10	Bruton	10 0 0	4 0 0	8 0 0
		Brynmawr			
100	25	Buckingham	25 0 0	5 0 0	25 0 0
		Burford			
		Burnley £19,946		4 10 2	
		Burslem & Tunstall			
		Burton-on-Trent			
		Bury, Lanc. £6570			
		Bury St. Edmund's		5 0 0	
200	10	Buxton	10 0 0		
		Callington			
		Calne, Wilts			
		Camborne			
		Cambridge £34,560		7 0 0	
240	50	*Canterbury*	50 0 0	6 0 0	61 to 63
240	25	*Ditto*, second issue	25 0 0	6 0 0	30 to 31
		Cardiff £12,000		7 10 0	
		Carmarthen			
		Castleford			
		Chapel on the Frith			
		Chard			
		Chatteris			
		Cheadle			
		Chelmsford			
		Cheltenham £18,732		8 10 0	
		Chepstow			
		Chertsey			
230	10	Chesham, Bucks	10 0 0		
		Chester			
		Chester-le-Street			
		Chesterfield £13,123		4 17 6	
240	25	Chichester	25 0 0	6 0 0	30 0 0
		Chippenham			
		Chipping Norton			
		Chirk			
		Chorley			
		Christchurch			
		Chudleigh			
		Cirencester			
		Cleckheaton, York.			
		Clitheroe			
		Cockermouth			
		Colchester			
		Collumpton			
		Colne, Lancashire			
		Coleford, Gloucest.			
		Coggeshall			
		Congleton £5000		5 0 0	
		Cowbridge			
		Corsham			
800	25	*Coventry*	25 0 0	6 0 0	24 to 25
		Cowes			
		Crewkerne			
		Crowland			
		Croydon £20,000		5 0 0	
		Cranbrook £1900		5 0 0	
		Crayford & Bexley			
		Crediton			
		Crewe, Cheshire			
		Cricklade			
		Dalton			
		Darlaston			
		Darlington			
250	20	Dartford	20 0 0	7 10 0	27 0 0
		Dartmouth			
125	20	Daventry	20 0 0	6 0 0	21 8 0
		Dawley, Salop			
		Dawlish			
		Deal			
		Dedington			
500	6	Denbigh	6 0 0	5 0 0	6 0 0
820	10	Deptford	10 0 0		1 to 2
325	50	*Derby*	50 0 0	10 0 0	78 0 0
90	20	Dereham (East)	20 0 0	4 10 0	
1000	5	*Dewsbury*	5 0 0	10 0 0	8 12 6
		Devizes			
4000	5	*Devonport*	5 0 0	6 0 0	6 5 0
280	25	Dorchester	25 0 0	5 0 0	30 0 0
120	25	Dorking	20 10 0	5 0 0	21 10 0
		Douglas, Isle of M.			
209	56¼	*Dover*	56 10 0	5 15 0	71 to 72
		Downham			
		Driffield			
		Droitwich			
600	20	*Dudley*	20 0 0	4 0 0	20 to 22
		Droylsden			
		Dukinfield			
		Dunmow			
		Dunstable			
		Durham			
276	9	Dursley, Gloster	9 0 0	5 10 0	8 0 0
300	10	Eastbourne			
		East Grinstead			
		Elland			
		Ellesmere			
		Emsworth			
400	5	Enfield	5 0 0	5 0 0	5 0 0
300	19	Epsom and Ewell	19 0 0		
		Evesham			
		Exeter £40,000		10 0 0	
		Exmouth			
		Eye, Suffolk			
		Fairford			
64	25	Fakenham	25 0 0	5 0 0	25 0 0
		Falmouth			
		Fareham			
120	25	Farnham	25 0 0	10 0 0	42 0 0
		Farringdon			
		Faversham			
		Filey			
		Fleetwood			
300	10	Folkestone	10 0 0	10 0 0	15 0 0
240	10	„ new shares	8 0 0	10 0 0	13 0 0
		Fowey			
240	5	Framlingham	5 0 0	5 0 0	5 0 0
		Frome			
		Garstang			
		Gillingham, Dorset			
		Glastonbury			
		Glossop £10,000		9 0 0	
1000	25	*Gloucester*	25 0 0	7 10 0	28 0 0
		Gomersal			
		Godalming			
		Gorleston & South-Gosport	[down		
		Grantham			
1000	20	Gravesend	20 0 0	5 0 0	21 0 0
		Grays (Essex)			
1600	10	*Great Grimsby*	8 0 0	8 0 0	13 to 13½
		Guildford	25 0 0	4 0 0	20 0 0
		Guisborough			
		Hadleigh			
		Hailsham			
		Hales Owen			
300	6	Halesworth	6 0 0	7 10 0	5 10 0
600	25	*Halifax*	25 0 0	10 0 0	48 0 0
		Halstead			
		Hampton Court			
		Harrogate £10,000		5 0 0	
		Harrow on the Hill			
5		*Hartlepool* £15,137	5 0 0	7 10 0	7 5 0
		Haslingden, Lansh.			
330	50	Hastings and St. L.	50 0 0	6 0 0	60 0 0
		Havant			
		Haverhill			
		Haworth, Yorks.			
		Hayle			
		Hebden Bridge			
		Helstone			
		Hemel Hempstead			
300	10	Henley-on-Thams.	10 0 0		
		Hereford £5300		4 0 0	
		Herne Bay			
270	10	Hexham	10 0 0	7 0 0	12 0 0
		Heywood £10,000		5 0 0	
		Highworth (Wilts)			
230	10	Hinckley	10 0 0	5 0 0	7 0 0
		Hindley, Lancash.			
		Hitchen			
		Hythe			
		Hoddesden			
		Holbeach			
		Holmfirth £8880		3 10 0	
		Holyhead			
		Holywell (see Brit.			
		Honiton....[Prov.)			
		Horbury			
		Horncastle			
		Horsforth			
		Horsham			
	10	Houghton-le-Sprg.	10 0 0	8 0 0	
		Howden			
		Hull, Sculcoats (see British Provin.)			
		Hull, £11,712, 10s.		5 0 0	
210	10	Hungerford	10 0 0	5 0 0	10 0 0
		Huddersfield			
520	5	High Wycombe	5 0 0	6 0 0	6 16 0
		Idle and Eccleshill			
		Ilkeston			
		Ilminster			
		Ilford			
		Ilfracombe			
		Ironbridge			
1400	10	*Ipswich*	10 0 0	8 0 0	15 0 0
1400	10	„ new shares	7 10 0	8 0 0	12 10 0
800	25	*Isle of Thanet*	20 0 0	5 0 0	20 to 21
		Kendal £9100		8 15 0	
		Kenilworth			
		Keswick			
100	25	Kettering	25 0 0	5 0 0	25 0 0
		Kiddermins. £10000		5 0 0	
		King's Langley			
		Kington, Hereford			
		Kirkby Lonsdale			
		Kirkham, Lanc.			
		Knighton			
		Knutsford			
		Lancaster			
		Llanelly £3000		5 0 0	
		Llandovery			
		Leamington Priors £22,500		6 0 0	
		Leatherhead			
		Ledbury			
		Leeds Old Comp. old stk., £60,300		10 0 0	
		new „ £23,775		6 0 0	
		Leeds New £60,000		10 0 0	
		Leek			
		Leicester...£36,230		7 0 0	
		Leigh			
135	20	Leighton Buzzard	20 0 0	5 0 0	
		Leominster			
		Leyburn, Yorksh.			
		Liskeard			
330	25	Lewes	25 0 0	5 0 0	25 0 0
		Lincoln £8000		10 0 0	
		Leyland, Lancash.			
		Littlehampton			
250	20	Lichfield	20 0 0	10 0 0	30 0 0
		Liverpool United	100 0 0	10 0 0	220 to 222
		„ ¼ sh.	25 0 0	10 0 0	55 to 56
		Langport			
		London Comps.—			
5000	10	Anglo-Romano	5 0 0		5 0 0
5000	20	British Provincial (Holywell, Hull, Norwich, Potteries, Trowbridge)	20 0 0	7 0 0	22 to 23
	20	„ Prov., new	16 0 0	7 0 0	20 to 21
4000	25	*Commercial*	25 0 0	6 0 0	27 to 29
2000	25	„ new shares	2 10 0	6 0 0	par to 1pm
		„ deb. £12,000			
12,000	50	*Chartered*	50 0 0	4 0 0	39 to 40
6000	50	„ new shares	10 0 0	4 0 0	7¼ to 7½
2000	150	*City of London*	150 0 0	4 0 0	135 to 140
4000	50	*Equitable*	50 0 0	2 10 0	27 to 28
		„ deb. £46,000			
10,000	20	European— (Amiens, Boulogne, Caen, Havre, Nantes, & Rouen)	20 0 0	5 0 0	12 to 15
	20	„ do. new	7 10 0	5 0 0	9 to 10
15,000	10	*Gt. Cntl. Consumers* deb. £66,000	10 0 0	7 10 0	13¼ to 14

Number of Shares issued.	Amount per Share	Name of Company.	Amount paid up per Share	Dividend per Cent. per Ann.	Price.
	£		£ s. d	£ s. d	£ s. d
		Impl. Continental			
8000	50	—First capital			
		(Amsterdam,			
		Berlin, Ghent,			
		Hanover, Lille,			
		Rotterdam)	42 0 0	6 11 0	48 to 50
7000	50	Second capital—			
		(Aix la Chapelle,			
		Antwerp, Bordeaux, Brussels,			
		Cologne, Frankfort-on-Maine,			
		Haarlem, Marseilles, Toulouse			
		Vienna)	41 0 0	10 7 0	70 to 72
	50	Third capital	43 10 0	9 4 0	68 to 70
10,000	50	*Imperial*	50 0 0	6 0 0	86 to 88
3000	50	„ new shares	45 0 0	6 0 0	80 to 82
		„ deb. £50,500			
4000	40	*Independent*	40 0 0	6 0 0	46 to 47
3000	50	*London*	50 0 0		5 0 0
6000	25	„ preference	25 0 0	6 0 0	25 to 26
3000	50	„ 2nd do.	50 0 0		15 to 18
9000	50	*Phœnix*	49 0 0	3 10 0	28 to 29
1000	100	*Ratcliff*	90 0 0	5 0 0	70 to 75
4000	25	*South Metrop.*	25 0 0	5 0 0	20 to 22
7000	10	Surrey Consumers'	10 0 0	7 0 0	10 0 0
9000	50	United General—			
		(Cork, Dublin,			
		Limerick)	50 0 0	2 0 0	20 to 22
6400	20	Western A shares	20 0 0	2 0 0	10 0 0
3500	20	„ B „	10 0 0	2 0 0	
		Lostwithiel			
		Loughborough			
240	25	*Louth*	25 0 0	6 0 0	26 10 0
		Lowestoft (& Water)			
		Llangollen			
611	5	Ludlow Union	5 0 0	5 0 0	5 0 0
		Luton			
		Lutterworth			
		Lyme Regis			
		Lymington			
		Malmesbury		3 15 0	
		Macclesfield 32,000 £			
		Maidenhead			
300	50	*Maidstone*	50 0 0	10 0 0	90 0 0
		Maldon			
		Marlborough			
		Malton (New)			
		Malvern			
		Manningtree		10 0 0	
		Mansfield £5000			
		March			
		Margate (see I. of T.			
		Market Drayton			
132	25	Market Harboro'	25 0 0	6 0 0	30 0 0
		Market Raisin			
		Market Weighton			
		Marlow			
370	10	Maryport	10 0 0	6 0 0	12 0 0
		Matlock			
		Melksham			
		Melton Mowbray			
		Merthyr Tydvil			
		Mere		5 0 0	
		Middleton £9000			
		Midsummer Norton			
		Middlesboro'			
		Mildenhall		5 0 0	
700	10	Mitcham	10 0 0	10 0 0	14 10 0
		Mold			
700	10	Monmouth	10 0 0	5 0 0	
		Monk Wearmouth			
		Moreton in Marsh			
		Morley (nr. Leeds)			
		Mottram			
		Morpeth			
		Nantwich			
		Neath			
		Needham Market			
		Newark £5000		10 0 0	
250	20	Newbury	20 0 0	5 0 0	20 0 0
13,000	5	Newcastle & Gateshead Union	5 0 0	8 0 0	7 15 0
		Newcastle-under-Lyne £6200		4 0 0	
600	5	Newmarket	5 0 0	6 0 0	5 0 0
		Newnham, Glost.			
		Newent			
		New Mills £2115			
		Newport, M. £11720		8 0 0	
320	50	*Newport, Isle of W.*	38 0 0		5 0 0
		Newport Pagnell			
		Newport, Salop			
		New Romney			
		Newton Abbot			
		Newton, Lane			
		Newtown (Mntgom.			
		Northallerton			
		North Walsham			
542	20	*Northampton*	18 0 0	10 0 0	28 0 0
		Northwich			
		Norwich (see British Pro. £40,000		7 0 0	
900	50	*Nottingham*	50 0 0	10 0 0	
900	50	New shares		10 0 0	
		Nuneaton			
		Oakham			
		Oakhampton			
200	10	Odiham, Hants	10 0 0	4 0 0	10 0 0
		Olney			
		Ongar			
		Ormskirk			
		Otley, Yorkshire			
		Oundle			
120	150	*Oxford*	150 0 0	6 10 0	230 0 0
		Ower Darwen £8000		5 0 0	
		Padstow			
		Pately Bridge, Yrk.			
250	20	Penrith	15 0 0	6 10 0	21 0 0
		Penryn			
		Penzance			
200	10	Petworth	10 0 0	9 0 0	14 15 0
		Petersfield			
		Pickering			
3000	10	*Plymouth*	10 0 0	10 0 0	11 0 0
		Pocklington			
		Pontefract			
		Pontypridd		4 0 0	
400	10	Poole	10 0 0	5 0 0	10 0 0
		Port Madoc			
600	50	*Portsea Island*	53 0 0	5 0 0	51 to 52
400	10	Prescott	9 0 0	4 13 4	7 0 0
3000	20	*Preston*	20 0 0	10 0 0	
		Pwllheli			
		Pudsey £12,000		5 0 0	
		Quordon and Mountsorrell			
		Radcliff and Pilkington £9000		4 12 10	
		Ramsay, I. of Man			
		Ramsgate (see I. of T.			
		Ravenglass			
1000	10	*Reading*	10 0 0	4 0 0	7 0 0
500	20	*Reading Union*	20 0 0	5 0 0	17 0 0
		Redditch			
		Redruth			
		Reigate			
		Retford (East)			
		Rhyl			
		Richmond (Surrey)			
		Rickmansworth			
		Ringwood			
		Ripon			
		Rochester and Chatham £20,000		6 0 0	
		Rochford			
		Rockingham			
		Romford			
		Ross			
215	25	*Rotherham*	25 0 0	6 0 0	39 to 40
	12½	do. Half Shares	12 10 0	6 0 0	19 to 20
		Royston			
		Ruabon			
		Rugby			
		Rugeley			
		Runcorn £11,000		7 10 0	
		Ruthin			
500	10	Ryde	10 0 0	6 0 0	12 0 0
		Rye			
		Romsey			
		Saddleworth			
225	20	Saffron Walden	20 0 0	3 15 0	19 0 0
		St. Alban's			
		St. Austel			
		St. Asaph			
		St. Colomb			
		St. Helen's £7500		7 10 0	
		St. Helier's (Jersey)			
		St. Ives, Hunting.			
		St. Ives, Cornwall			
250	10	St. Neot's	10 0 0	8 0 0	12 0 0
		St. Peter's Port, (Guernsey)			
320	25	Salisbury	25 0 0	6 0 0	28 to 30
		Sandbach			
140	10	Saxmundham	10 0 0	5 0 0	10 0 0
		Scarborough			
		Sedburgh			
		Selby			
		Settle			
290	10	Sevenoaks	10 0 0	5 0 0	10 0 0
		Shaftesbury			
5400	25	*Sheffield United*	24 0 0	8 6 8	28 to 28½
		Shelton, Potteries (see Brit. Prov.)			
		Shepton Mallet			
		Sherborne			
2914	5	Shields (Tynemth.	5 0 0	3 0 0	5 0 0
		Shields (South)			
		Shifnal, Salop			
1000	5	*Shipley*	5 0 0	6 0 0	7 10 0
		Shipston-on-Stour			
		Shoreham			
		Shrewsbury £10,000		7 0 0	
400	10	Skipton	10 0 0	4 0 0	11 0 0
250	10	Sleaford			
		Slough	10 0 0		
		Snaith			
		Soham			
		Southam			
		Southwold			
		South Molton			
1000	50	*Southampton*	32 0 0	5 0 0	
		Sowerby, Yorksh.			
		Spittal (Berwick-on-Tweed)			
		Spilsby			
		Staindrop			
		Stretford			
		Stokesly			
		Stafford £10,000		5 0 0	
		Staines and Egham			
		Staley Bdg. £15,000		10 0 0	
		Stamford £11,250		3 0 0	
840	9½	*Stockton-on-Tees*	9 10 0	9 0 0	8 0 0
1000	10	Stoke-upon-Trent	10 0 0	7 0 0	12 15 0
500	10	„ new shares	8 0 0	7 0 0	10 10 0
		Stone, Stafford			
		Stoney Stratford			
		Stourbridge			
		Stowmarket			
150	20	Stratford-on-Avon	20 0 0	7 10 0	30 0 0
		Stroud			
169	10	Swaffham	10 0 0	5 0 0	5 10 0
		Swansea £9000			
		Sudbury			
		Sunderland, old			
6400	5	*Sunderland*, new	5 0 0	5 0 0	5 5 0
		Sutton (Surrey)			
250	10	Sutton-in-Ashfield	10 0 0	5 0 0	
		Swindon			
	10	Sydenham	10 0 0	6 0 0	12 0 0
2800	5	*Taunton*	5 0 0		
		Tadcaster			
		Tamworth			
		Tavistock			
		Teignmouth			
		Tenbury			
		Tenby			
150	10	Tenterden	10 0 0	4 0 0	8 0 0
		Tetbury, Gloster			
		Tewkesbury			
		Thame			
		Thetford			
		Thirsk			
		Thornbury			
		Thorne			
		Tiverton			
1141	5	Todmorden	5 0 0	5 0 0	6 0 0
		Topsham			
		Torquay			
		Torrington, Devon			
		Totnes			
		Totnes Consumers			
4000	5	Tottenham	3 15 0	8 0 0	4 0 0
		Towcester			
		Town-Malling			
200	10	Tring	10 0 0	5 0 0	10 0 0
		Trowbridge (see			
75	50	Truro [Brit. P.)	50 0 0	2 0 0	
		Tunbridge			
		Tunbridge Wells			
		Ulverston			
		Uppingham			
210	5	Upton-on-Severn	5 0 0	5 0 0	5 0 0
		Usk, Monmouth			
		Uttoxeter			
		Uxbridge			
		Ventnor			
1000	25	*Wakefield*, old capl	25 0 0	6 0 0	25 0 0
1600	5	„ new „	5 0 0	6 0 0	5 0 0
		Wallasey			
300	10	Wallingford	10 0 0	5 0 0	8 0 0
		Wandsworth			
		Wantage			
		Warrington £23304		10 0 0	
100	10	Wareham	10 0 0	3 10 0	8 0 0
120	25	Warminster	25 0 0	5 0 0	27 0 0
		Warth			
		Warwick £15,000		6 0 0	
		Watford			
		Welchpool, Mntgy.			
		Wellingborough			
		Wellington, Salop		7 10 0	
		Wellington, Smrst.			
		Wells, Smrst. £5000		7 10 0	
		Westbury			
		Weston-sup.-Mare			
2600	5	West Ham	5 0 0	5 0 0	5 0 0
		Whitby			
		Whitehaven			
		Whitstable			
		Whittlesea			
		Wigan £10,160		10 0 0	
		Willenhall			
		Winchelsea			
		Winslow			
240	10	Wimborne Minster	10 0 0		
		Wimbledon			
		Wincanton			
380	50	Winchester	50 0 0	6 0 0	
900	12½	Windsor	12 10 0	10 0 0	23 0 0
		Witham			
		Witney			
4480	10	*Wolverhampton*	10 0 0	9 0 0	20 0 0
4480	10	do. new shares	1 5 0	9 0 0	3 10 0
		do. deb. £10,000			
200	10	Woburn	10 0 0	5 0 0	10 0 0
210	10	Wokingham	10 0 0		10 0 0
		Woodbridge			
600	2½	Woodstock	2 10 0		
	1	Wooler			
		Wotton-un.-Edge			
		Worcester £29,000		8 0 0	
		Workington			
		Worksop & Radford			
		Wirksworth			
		Worthing			
		Wrexham			
		Woolwich Equitbl.			
		Woolwich Consms.			
		Woolwich (North)			
		Wymondham			
		Yarm			
795	20	Yarmouth	20 0 0		17 to 18
		Yeadon, near Leeds			
		Yeovil			
		Fork Untd. £55,000		7 0 0	
		SCOTLAND.			
	5	Aberdeen	3 11 0		4 11 6
		Airdrie			
		Alloa			
		Annan			
		Anstruther			
		Ardrossan			
550	20	Arbroath	20 0 0	7 10 0	27 10 0
		Auchterarder			
750	2	Auchtermuchty	2 0 0	6 0 0	2 7 6
		Ayr, old			
		Ditto, new			
		Banff			
		Barrhead			
		Bathgate			
		Beith			
		Bervie			
		Biggar			
		Blairgowrie			
400	6	Borrowstowness	6 0 0	5 0 0	8 0 0
	5	Brechin	5 0 0	8 10 0	8 10 0
		Bridge of Allan			
	2	Broughty Ferry	2 0 0	5 0 0	2 0 0
		Burntisland			
		Campbelton			
		Clackmannan			
		Coatbridge			
		Coldstream			
		Collinsburgh			

Number of Shares issued.	Amount per Share	Name of Company.	Amount paid up per Share	Dividend per Cent. per Ann.	Price.
	£		£ s. d	£ s. d	£ s. d
		Comrie			
		Crieff			
		Crail, Fife			
		Cullen			
		Cumbernauld			
		Cumnock			
600	5	Cupar Angus	5 0 0	6 0 0	5 10 0
250	10	Cupar Fife	10 0 0	7 10 0	14 0 0
		Dalkeith			
		Denny			
		Dingwall			
		Dornoch			
		Douglas			
		Dufftown			
		Dumbarton			
400	20	Dumfries	14 0 0	5 0 0	20 0 0
		Dunbar			
		Dunblane			
	23⅞	*Dundee, old* £29,687	23 15 0	8 8 0	30 10 0
8000	5	*Dundee, new*	5 0 0	4 6 0	4 13 0
860	10	Dunfermline	10 0 0	6 0 0	12 12 0
		Dunkeld			
		Dunoon			
		Dunse			
		Dysart			
6000	25	*Edinburgh Gas Co.*	25 0 0	10 0 0	55 0 0
5480	25	„ *and Leith Co.*	18 0 0	7 10 0	27 13 6
		Elie			
		Elgin			
		Falkirk, old			
		„ new			
		Falkland			
		Ferry Port on Craig			
		Fochabers			
		Forfar			
		Fort William			
		Fraserburgh			
		Galashiels			
		Garlieston			
		Gatehouse n. Fleet			
		Girvan			
6000	25	*Glasgow*	25 0 0	10 0 0	54 0 0
15000	10	*Glasg. City & Suburb.*	10 0 0	9 0 0	19 10 0
		Grangemouth			
		Grahamston			
		Haddington			
1500	5	*Hamilton*	5 0 0	8 0 0	7 5 0
		Hawick			
		Helensburgh			
		Huntly			
		Inverary			
400	1	Inverkeithing	1 0 0	5 0 0	1 0 0
1200	10	*Invern. Gas & Water*	10 0 0	7 10 0	15 0 0
2400	5	„ new shares	1 5 0	7 10 0	2 5 0
		Irvine			
		Jedburgh			
		Johnstone (Paisley)			
		Keith			
		Kelso		10 0 0	
		Kilmarnock			
		Kincardine			

Number of Shares issued.	Amount per Share	Name of Company.	Amount paid up per Share	Dividend per Cent. per Ann.	Price.
	£		£ s. d	£ s. d	£ s. d
		Kinghorn			
		Kingskittle, Fife			
		Kinross			
		Kirkaldy			
320	5	Kirkcudbright	5 0 0	5 0 0	5 0 0
1000	3	Kirkintulloch, near Glasgow	3 0 0	5 0 0	3 0 0
227	5	Kirkwall	5 0 0	5 0 0	4 10 0
518	5	Kirriemuir	5 0 0	6 0 0	
		Lanark			
		Largo, near Leven			
		Largs			
		Lasswade, n. Edin.			
		Lauder			
		Leith			
		Leslie, Fife			
		Lesmahago			
		Leven			
		Linlithgow			
		Linton, n. Nobleh.			
		Lochee, n. Dundee			
		Lochgilphead			
		Lochwinnock, near Paisley			
1200	1	Markinch	1 0 0	7 10 0	1 5 0
		Mauchline			
		Maxwell-town, n. Dumfries			
		Maybole, Ayrshire			
		Maryhill, n. Glasg.			
		Melrose			
718	2	Mid & East Calder	2 0 0		2 0 0
192	5	Moffat	5 0 0		
	13¼	Montrose	13 10 0	7 11 1	
		Musselburgh			
		Nairn			
		Neilston, n. Glasg.			
		Newmills, near Kilmarnock			
		Newburgh, Fife			
		Newton-on-Ayre			
		Newton Stewart			
		North Berwick, n. Haddington			
		North Queensferry			
		Oban			
		Peebles		4 16 0	
800	25	Perth	25 0 0		22 10 0
	5	„ new	5 0 0	2 10 0	4 2 6
		Peterhead			
		Pittenweem			
		Pollokshaws, n Glag			
		Port Glasgow			
		Portobello, n. Edin.			
		Prestonpans			
		Rutherglen, nGlasg			
		Renfrew, n. Paisley			
		Saltcoats			
		Sanquhar			
		Selkirk			
		South Queensferry			

Number of Shares issued.	Amount per Share	Name of Company.	Amount paid up per Share	Dividend per Cent. per Ann.	Price.
	£		£ s. d	£ s. d	£ s. d
		St. Andrew's			
		Stewarton			
		Stirling			
		Stonehaven			
		Stonhouse, Lanrks.			
		Stornoway			
		Stranraer			
		Strathaven, near Thurso... [Hamltn			
		Tillicoultry, n. Alloa			
800	1	Tranent	1 0 0		1 0 0
		Troon			
		Wick			
		Wigton			
		Wemyss	4 10 0		
		IRELAND.			
300	10	Armagh	10 0 0	10 0 0	20 0 0
		Ballinasloe			
700	80	*Belfast*	80 0 0	4 0 0	80 0 0
		Ballymena			
		Ballymoney			
		Ballynahinch			
		Carrickfergus			
		Carlow			
		Cavan			
		Cork (see Un. Gen.)			
		Cookstown			
1300	5	Clonmel Consumrs	5 0 0	5 0 0	5 0 0
		Drogheda			
19,000	10	*Dublin Consumers*	6 0 0	7 0 0	8 10 0
		Dublin Hibernian (see United Gen.)			
160	25	Dundalk	25 0 0		22 0 0
		Dungannon			
871	5	*Downpatrick*	5 0 0	4 0 0	
		Enniskillen			
		Enniscorthy			
240	25	Galway	25 0 0	10 0 0	35 10 0
		Keady			
400	10	Kilkenny	10 0 0	8 0 0	11 5 0
		Killarney			
		Larne			
		Limerick (see U.G.)			
1725	5	Limerick Consum.	5 0 0	5 0 0	5 0 0
		Lismore			
600	15	Londonderry	15 0 0	6 13 4	21 10 0
500	7	Lisburn	7 0 0	7 10 0	8 5 0
520	10	Lurgan	6 0 0	6 0 0	6 0 0
		Mallow			
		Monaghan			
		Nenagh			
418	5	Newtownards	5 0 0	4 0 0	5 0 0
		Newtownlimavady			
		Newry			
		Omagh			
125	20	Portadown	20 0 0	5 0 0	20 0 0
		Portaferry			
600	10	Sligo	10 0 0		
		Tralee			
		Waterford			

The Gas Works in the undermentioned towns belong to private individuals:—

Abergavenny.	Chester (new).	Goole.	Huntingdon.	Newport I. W. (new).	Sheerness.	Ware. (2 works)
Beccles.	Eltham.	Harleston.	Hyde (Cheshire)	Oswestry.	Sidmouth.	Wem.
Bridgenorth.	Ely.	Hatfield.	Kingston-on-Thames.	Peterborough.	Sittingbourne.	Wexford.
Brompton & Gillingham	Farsley.	Hertford.	Lynn.	Pontypool.	Spalding.	Weymouth.
Bungay.	Fermoy.	Holt.	New Ross.	Sandwich.	Tipperary.	Whitchurch (Salop).
Carnarvon.	Gainsborough.	Hunmanby.	Northfleet.	Seaham Harbour.	Waltham Abbey.	Wisbeach.

The Gas Works belong to the Corporations, or to Commissioners acting under special acts of Parliament, in the following towns:—

Carlisle.	Greenock.	Lytham (Lanc.)	Oldham.	Rothesay.	Southport (Lanc.)	Walsall.
Cashel.	Haverfordwest.	Manchester.	Paisley.	Richmond (Yorkshire).	Stockport	Wells (Norfolk).
Coleraine.	Keighly.	Milton (Kent).	Rochdale.	Salford.	Strabane.	Youghail.
Doncaster.	Knaresborough.					

Price Current.

CASTINGS, per Ton.

Average Weight of Cast Iron Gas Pipes, per Yard.

1½ in.	2 in.	2½ in.	3 in.	4 in.	5 in.	6 in.	7 in.	8 in.	9 in.	10 in.	12 in.
16	21	28	33	51	70	89	107	126	149	177	208 lbs.

Retail Prices are 5 to 10 per cent. higher.

	London.	Glasgow	Newcastle.	Wales.	Yorksh., Derbysh. and Staffordsh
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Pig Iron, No. 1	4 0 0	2 15 0	3 15 0	4 5 0	4 0 0
1½ and 2 inches Socket Pipes	7 5 0	6 10 0	6 5 0	6 15 0	6 10 0
2½ and 3 do. do.	7 0 0	6 5 0	5 15 6	6 10 0	6 0 0
4 and 5 do. do.	6 15 0	6 0 0	5 10 0	6 5 0	5 15 0
6 inches and upwards do.	6 10 0	5 15 0	5 5 0	6 0 0	5 10 0
Extra for bends, branches, and connection	2 10 0	2 10 0	2 10 0	2 10 0	2 10 0
Retorts, 2nd fusion, hot blast	6 10 0	5 10 0	5 0 0	6 0 0	5 5 0
Do. 2nd fusion, cold blast	7 0 0	..	5 10 0	6 10 0	5 15 0
Tank Plates, ¾ thick and above	6 10 0	5 15 0	5 5 0	6 0 0	5 10 0
Do. less than ¾	7 0 0	6 5 0	5 15 0	6 10 0	6 0 0
Plain Castings ex. models	6 15 0	6 0 0	5 10 0	6 5 0	6 15 0

COALS.

NEWCASTLE. Unscreened.	s.	d.	
Whitwell Primrose	4	6	per ton.
Burnhope	5	9	„
Dean's Primrose	5	9	„
Pelton, Brancepeth, Medomsley	6	0	„
Pelaw	6	3	„
Eighton Moor, Felling Main, New Pelton, Peareth, South Pelaw, Waldridge, Washington Hutton, South Peareth	6	6	„
Ramsay's Cannel	12	0	„
Cowen's Cannel	12	0	„

DERBYSHIRE.	
Clay Cross, Deep Main, and New Birchwood	6s. 6d. per ton.

SCOTCH CANNEL.		
Boghead at Leith	21	0 „
Kirkness best	23	0 „
Capeldrae, first quality	20	0 „
Ditto, second quality	10	0 „
Lothian	16	0 „
Lesmahago at Glasgow	16	0 „
Ditto at Leith	17	6 „
Arniston	16	0 „
Wemyss	14	0 „
Donibristle	10	6 „
Bridgeness, Kinneil	11	0 „
Knightswood, Lochgelly, Lumphinan	10	0 „
	9	6 „

FIRE GOODS.

Best Bricks, 50s. per 1000, at Newcastle.
Do. Clay, 12s. per ton do.

LEAD.

Soft pig, £23 to £24 per ton.

WROUGHT IRON TUBING, subject to 25 per cent. Discount.

	2 inches.	1½ inch.	1¼ inch.	1 inch.	¾ inch.	½ inch.
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
Patent welded tubes, from 2 to 12 feet, per foot	1 8	1 0	0 10	0 7	0 5	0 4½
Ditto „ 6 in. to 18 in., each	3 0	2 0	1 9	1 3	1 0	0 9
Connecting pieces, or long screws	3 6	2 3	2 0	1 6	1 2	0 11
Bends, springs, and elbows, wrought iron	3 9	2 3	1 9	1 0	0 10	0 8
Tees, wrought or cast	4 0	2 6	2 0	1 6	1 1	0 10
Crosses, wrought or cast	4 6	3 0	2 6	2 0	1 6	1 2
Iron cocks	17 6	9 6	7 6	4 6	3 3	2 6
Ditto, with brass plug	28 0	16 0	13 0	7 0	5 6	4 6
Diminishing sockets, caps, plugs, and nipples	1 3	0 9	0 8	0 6	0 5	0 4
Plain sockets	1 0	0 8	0 7	0 5	0 4	0 3
Flanches	1 9	1 6	1 3	1 0	0 9	
Syphons, 2 quart	15 0	14 0	13 6	13 0	12 0	
Ditto 1 quart	11 6	10 6	10 3	10 0	9 6	

FREIGHTS, per Ton.

Coastwise—Newcastle.			
Chatham & Roches.	7s. 0d	Weymouth	8s. 3d
Cork	10 6	Yarmouth	5 6
Foreign.			
Dover	8 6	Boulogne	8 0
Dublin	10 6	Barcelona	25 0
Exeter Quay	10 0	Bordeaux	14 6
Folkestone	8 3	Calais	8 0
Hastings	9 9	Dieppe	9 6
Ipswich	6 6	Hamburg	9 6
Jersey	10 0	Havre	10 0
London	5 9	Leghorn	24 0
Lowestoft	5 6	Lisbon	16 0
Lynn	6 3	Rotterdam	9 0
Margate	8 0	Rouen	12 0
Portsmouth	8 9	St. Petersburgh	15 0
Plymouth	8 9	Stettin	11 6
Southampton	8 9	Trieste and Venice	28 0
Whitstable	7 3		